

AUTOMOTIVE INDUSTRIES

AUTOMOBILE

Reg. U. S. Pat. Off

Published Weekly

Volume 73

Number 11

JULIAN CHASE, Directing Editor

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JEROME H. FARRIS, Ass't Editor

P. M. HELDT, Engineering Editor
JOS. GESCHELIN, Detroit Technical Editor
HAROLD E. GRONSETH, Detroit News EditorT. LAWTON SLAUGH, News Editor
GEOFFREY GRIER, Art Editor

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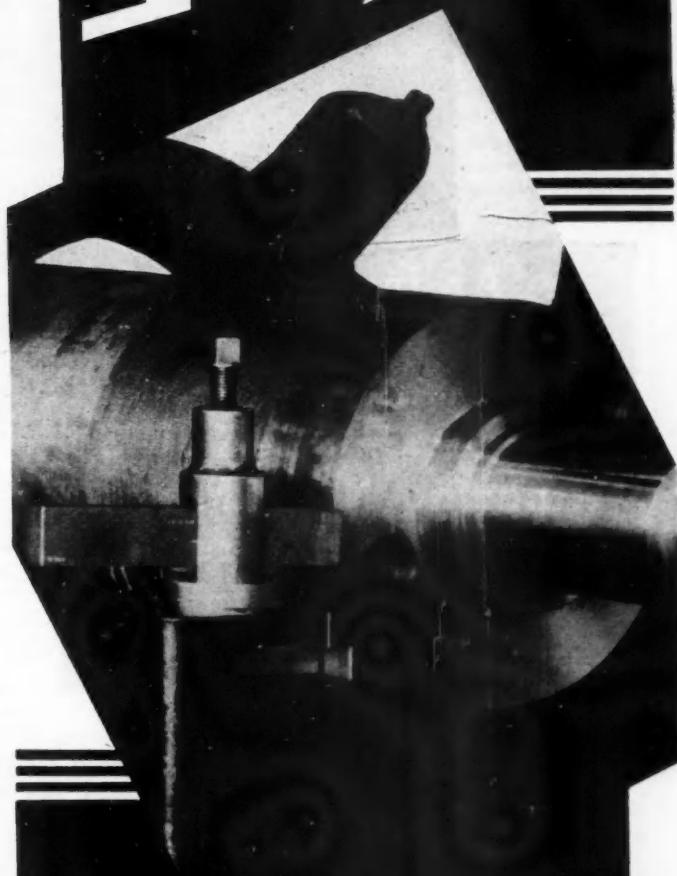
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Automotive Industries

Y-RAMET

*Performs
perfectly on
this job . . .*



Roll 15³/₄ diameter x 80" long
S. A. E. 1020. Cutting speed
440 ft. Feed .048 . . . depth of
cut 1¹/₂". 4 pieces per grind. Our
metallurgical department will
be glad to help you in the
application of Vascoloy-Ramet
in your plant.

VANADIUM- ALLOYS STEEL CO.

PITTSBURGH, PA.

Orders and inquiries should be directed to Vanadium-
Alloys Steel Co., 1440 West Randolph St., Chicago, Ill.

September 14, 1935

posed of by agreement as a result of the procedure of collective bargaining. In these negotiations the outside unions were among the most active participants.

The elections held under the supervision of the Board were designed to afford the employees of the industry an opportunity to select their own representatives and to do it free from any improper influence. The form of the ballots used in the primary and final elections and the rules of the elections offered the voters the alternatives essential to free choice. They could vote for men and designate organi-

zations. The men receiving the highest vote were elected and the designated vote for organizations determined the amount of their representation on the plant bargaining agencies. The procedure of the elections involved all conceivable safeguards against coercion.

And the results of the election furnish all the proof needed of their secrecy and freedom. Of all the persons working on the days of the primary elections, 89 per cent voted and of all the ballots cast in the primaries, more than one-fourth designated labor organizations, whereas 68 per cent were undesig-

nated or unaffiliated ballots. It is perhaps an interesting commentary on the neutrality of the managements in these polls that the company unions, generally regarded as the creature of the employers, polled in 63 plants in the industry only 13 per cent of the whole vote recorded in the nominating elections.

Bargaining Agencies

Organization of the bargaining agencies, composed of elected and designated representatives, was the last phase in the work of the Board. After the installation of the first of the newly elected agencies and conferences with many of them, the Board on April 12, 1935, issued rules and instructions for the guidance of the bargaining agencies and managements in their joint relations. Since the majority of the agencies were not elected until April and May of this year, their history is brief. But the observations which the Board and its agents were able to make while it was still at work and the reports it has since received indicate that these agencies are generally performing with zeal and effectiveness the functions of representation for which they were created.

In the brief space of little more than a year that elapsed between the announcement of the President's Automobile Settlement on March 25, 1934, and the termination of the work of the Automobile Labor Board on June 16, 1935, the most noteworthy change in labor relations in the automobile manufacturing industry is the degree to which collective bargaining has become the accepted method of negotiation. In the next years, the probabilities are strong that the advances so far made in this direction will persist and will be strengthened. And this is likely to be so not because collective bargaining is required by law but because the benefits and merits of this year's experience have commended themselves to both men and management.

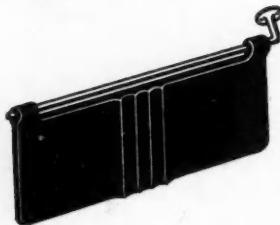
Reynolds Spring to Open Detroit Plant Oct. 1

Orders received by the cushion spring division of Reynolds Spring Co. exceed considerably the capacity of its Jackson, Mich., plant and will necessitate the opening on Oct. 1 of its Detroit plant, which has been closed since early in 1932. The company's molding division has orders on hand sufficient to assure this plant operating at capacity starting Sept. 1, according to Charles G. Munn, president.

WHAT'S NEW IN *Plastics?*

THIS MONTH

Visors, Shafts, Garnish Trim New Materials



Visors: Current research proves that sun visors made from molded or laminated plastic material are practical, both mechanically and in cost. The new Durez visors would be scratch-proof, stain-proof, grease-proof, peel-proof, and more easily kept clean. Lighter fittings could be used. Plain, matt, ribbed, or many other finishes can be produced by the one molding process.

Small Shafts:



Development of new materials is increasing mechanical uses of Durez. For instance, we now have a material with greater torsional strength and wear-resistance suitable for water pump parts, rods, shafts, etc. It resists the effects of water, oil or gasoline, is lighter than metal, and cannot corrode or rust.



Garnish Trim: New cars will be using Durez trim as soon as the proper dies can be worked out. There are lots of advantages: the Durez finish can't wear off because it's part of the piece and goes all the way through; decorative possibilities are unlimited; less resonance; Durez can't rust or chip; and, we suspect, trick molded-in keys for screwless attachment will be developed. If not, Durez can be drilled. Entire garnish trim units, ready to install, will be produced in one production operation.

New Materials: For brake linings, clutch facings, etc., try Durez 175 or 1606 Resin. 1606 is for impregnated or molded blocks, while 175 is for use in rubber linings. Both give remarkable wearing qualities, oil- and water-resistance, uniform friction coefficient.

If you're not familiar with Durez, we add that it's a hot-molded plastic, supplied either in molding compound form or as resins for impregnating, coating, etc., or in sheet form. New materials are being constantly developed, and we're always anxious to work with you in adapting this versatile material to your needs. Address: General Plastics, Inc., 450 Walck Road, North Tonawanda, N. Y.

Choice of the Motor Industry

DUREZ • Plastic Materials

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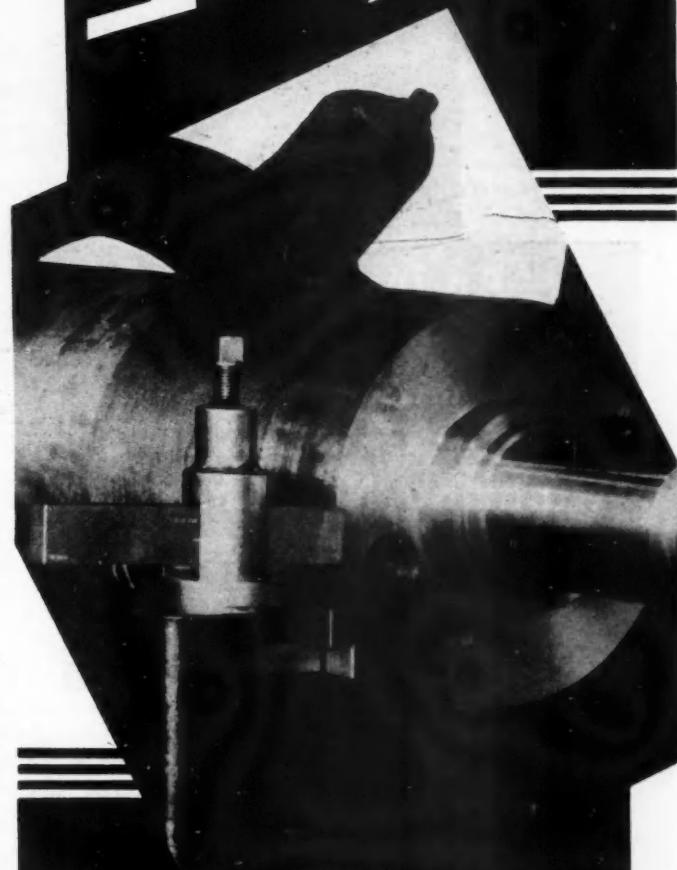
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Automotive Industries

DY-RAMET

*Performs
perfectly on
this job . . .*



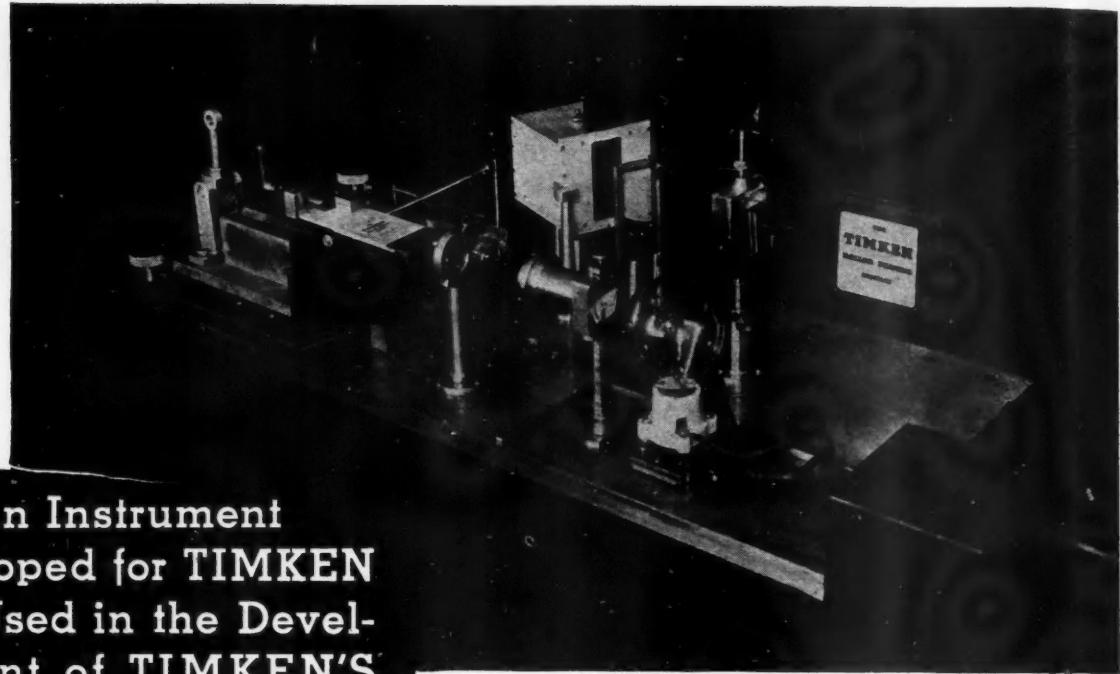
Roll 15³/₄" diameter x 80" long
 S. A. E. 1020. Cutting speed
 440 ft. Feed .048 . . . depth of
 cut ¹/₄". 4 pieces per grind. Our
 metallurgical department will
 be glad to help you in the
 application of Vascoloy-Ramet
 in your plant.

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Orders and inquiries should be directed to Vanadium-Alloys Steel Co., 1440 West Randolph St., Chicago, Ill.

September 14, 1935

the "PROFILOGRAPH"



An Instrument
Developed for TIMKEN
and Used in the Develop-
ment of TIMKEN'S
Amazing New "Mirror
Finish". Measures to
One Millionth of an Inch
(.000001")

TIMKEN Bearings have always been noted for the finely-finished surfaces of the rollers and races. Now Timken has gone still further and produced contact surfaces of such extreme fineness that only the term "mirror finish" can adequately describe them.

The main obstacle to obtaining such ultra fine finishes heretofore has been the absence of any instrument capable of accurately determining the extent and nature of the minute surface irregularities left by the action of cutting tools and grinding wheels. The development and perfection of the "Profilograph" has removed that obstacle.

As its name indicates, the "Profilograph" measures and records the profile of any finished or semi-

The "Profilograph" operates on a simple optical-mechanical principle. Essentially it consists of (1) a fine diamond point which acts as a tracer or detector, moving over the surface of the specimen being measured. (2) an optical system which magnifies the movements of the detector. (3) a camera which permanently records the magnified movements of the detector.

In order to record irregularities in the finely-ground surfaces of Timken Bearings, a vertical magnification of 2000 to 1 is used. This permits the accurate measurement of irregularities down to 1 to 2 millionths of an inch.

» «

finished surface, showing the peaks, medials and valleys in highly magnified form.

Since these initial irregularities, in Timken Bearings, represent an average surface variation of only a few millionths of an inch, it is evident that extreme precision is required in the measuring instrument. As a matter of fact, the "Profilograph" can detect and measure surface irregularities to within one millionth of an inch.

This improvement in finish is now being applied in the manufacture of Timken Bearings, but as considerable new equipment is required, its application to our entire production must necessarily be gradual.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN ^{TAPERED} ROLLER BEARINGS

September 14, 1935

Automotive Industries

AUTOMOTIVE INDUSTRIES

Vol. 73, No. 11

□ THIRTY-SEVENTH YEAR □

September 14, 1935

3,500,000 Forecast for '35

Estimate 8 Months' Output at 2,966,000 Cars, Trucks

by Harold E. Gronseth

Detroit News Editor, Automotive Industries

Production of the motor industry this year is about to cross the 3,000,000 mark and the goal of 3,500,000 units many liked to think the industry would reach in 1935 seems easily within reach. In fact the final figure should run well in excess of this volume. If the last four months do no better than corresponding months of 1934, the full year's output would run to 3,543,000 units. Should the 28 per cent gain shown by the first eight months hold for the balance of the year, the 1935 output would reach 3,700,000 units.

Announcement by the Automobile Manufacturers Association that the August output of its members was 178,166 cars and trucks, indicates that production of the entire industry last month approximated 243,000 units, a 30 per cent drop from July and some 1,700 units below August last year. If the August estimate proves correct, it was the first time this year that production has fallen below the corresponding month of 1934. That was due to no contraction in demand below 1934, since retail sales ran well ahead of a year ago, but to the two months advance in new model introductions. August production ran well above earlier estimates because some plants, anxious to clean up on 1935 runs, crowded into the month production that they had planned for early September. A strong truck demand also was a sustaining factor in the August output. The first eight months of 1935 brought an estimated output for the industry of 2,966,000 cars and trucks which compares with 2,317,109 units in like 1934 period and with the full year's output in 1934 of 2,869,963 units, which mark was attained about the third week of August.

Retail sales are showing a more pronounced seasonal decline, influenced also by approaching new model announcements and depleted dealer stocks. After holding up well through August the drop now is more abrupt. Passenger car sales in the domestic market last month are estimated at 242,000 and truck sales at 48,000, a total of 290,000 units, or a 24 per cent gain over August. (Turn to Page 353, Please)

Andrews Blocks Hupp Stockholders Meeting

Annual meeting of stockholders of Hupp Motor Car Corp. which was to have been held Wednesday, Sept. 11, was adjourned to Sept. 20 as result of a temporary injunction obtained by Archie M. Andrews and Frederick Dodge restraining directors from conducting the meeting.

The order was issued by Judge William A. Moncure in City Chancery Court at Richmond, Va. Mr. Andrews seeks to have the court, by appointment of a commissioner or by other proceedings, take charge of the stockholders meeting.

AFL Withdraws Its Charges Against Chevrolet, Fisher

The American Federation of Labor has withdrawn charges it filed against the Chevrolet and Fisher Body plants at Atlanta with the National Labor Relations Board. In the original complaint it was alleged the management of the GM units refused to recognize the AFL union of workers as the sole collective bargaining agency for all employees. First intimation of the Federation's action came from its Detroit office when it was stated the filing of the charges was an error and that they never should have been filed. At the Washington office of Carlton Ogburn, attorney for AFL, withdrawal of the charges was verified but no explanation for the action was made.

Buick to Announce New Line Sept. 28

Public announcement of the new line of Buick cars will be made Sept. 28, it was said at the opening of the sales convention now going on at the company's plant in Flint.

Race for Worker Membership in Motor Industry Looms Between AFL and AAWA

Formidable competition looms for the newly chartered AFL International Union of Automobile Workers in its effort to organize the motor industry. The Associated Automobile Workers of America, year-old off-shoot of the AFL, may prove to be the Federation's chief rival in the contest for membership which will be waged this fall and winter.

The Associated's officers noted with no little satisfaction the dissension that brewed at the International's recent constitutional convention in Detroit and are set to capitalize on the situation. Disaffection of the delegates and the belief that there is gen-

eral discontent in the ranks of the new organization was one of the main considerations in the AAWA decision to transfer its first national convention to Detroit. Originally slated to be held in Lansing, the union's National Council at a meeting Sunday decided to move to Detroit since, as Forrest Brown, president stated: "A large number of dissatisfied AFL workers are in Detroit and we intend to give them an opportunity to air their troubles at our convention." This convention is to be held Oct. 26 and 27.

By coincidence the AAWA convention in Detroit opportunely follows immediately the 55th annual AFL convention at Atlantic (Turn to Page 352, Please)

GM Aug. Sales to Consumers Top July; Biggest 8 Months' Totals Since 1929

August sales of General Motors' cars to consumers in this country for the second time this year exceeded the corporation's sales to U. S. dealers, consequently bringing about a sharp reduction in dealer inventories. Car buyers purchased 127,346 GM units last month, 18,701 more than the July total of 108,021 and 41,080 more than August of last year, when the total sales to consumers were 86,258. The previous month when sales to consumers passed sales to U. S. dealers was May.

In other sales divisions, sales to world dealers, and U. S. dealers, the totals showed a seasonal trend and fell below the levels attained during July, but moved to propor-

tions considerably above those for the corresponding month of 1934. Totals in all phases of August sales were the largest experienced by the corporation since 1929; the same is true of the eight months' totals for this year. Sales to world dealers for the January-August period were 1,181,030 units, comparing with 993,896 for the same months last year. Heavier buying by consumers since January 1 made its impression on dealer inventories, which for the first eight months of the current year reached a plus figure of 69,517 units against the higher 105,377 units for the same time of 1934.

The accompanying table shows General Motors 1935 and 1934 figures in comparison, and those of August and July of this year.

	Aug. 1935	July 1935	Aug. 1934	Eight Mos. 1935	Eight Mos. 1934
Sales to world dealers	124,680	167,790	109,278	1,181,030	993,896
Sales to U. S. dealers	103,098	139,021	87,429	952,343	787,850
Sales to U. S. consumers	127,346	108,645	86,258	884,826	682,473
Change in U. S. dealer stocks	-24,248	+30,376	+1,171	+69,517	+105,377
Sales to foreign dealers	21,582	28,769	21,849	228,687	206,046

Santa Fe RR Buys Powerful Diesel Locomotive from GM

It is announced by the Santa Fe Railroad that it has taken delivery from the Electro-Motive Corporation, a subsidiary of General Motors, of the most powerful Diesel locomotive yet placed in service. If tests prove successful the new locomotive will haul the line's crack train The Chief, between Chicago and the Coast.

The new "powerhouse on wheels" is rated at 3600 hp., weighs 240 tons, and is 127 ft. long. It is made up of two identical sections that can be operated singly or coupled together, and which can be connected up to any number of similar units, the whole being controlled by a single operator.

Bendix Gives Lama Temple to Chicago City Park

The Vincent Bendix Lama temple, one of the beauty spots of A Century of Progress, has been donated to the Chicago park district by Mr. Bendix. The unique structure will be reerected on a wooded island, the work of Frederick Law Olstead, landscape artist of the Fair of 1893. The temple consists of 30,900 separate pieces of richly carved wood and 25,000 copper roof plates.

Jenkins in a Duesenberg Beats Cobb's 24-Hr. Mark

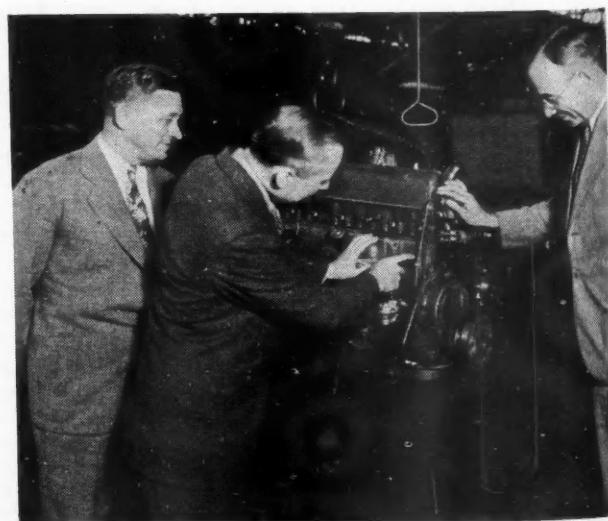
Driven by Ab Jenkins an American automobile powered with a supercharged Duesenberg special motor is reported to have averaged 135.47 m.p.h. in a 24-hour speed run on the salt beds at Bonneville. Jenkins was assisted by Tony Gulotta.

The 135.47 m.p.h. average made by Jenkins nosed out the 134.85 m.p.h. record recently established by John Cobb, English racing driver and sportsman, in his 700 hp. special built Napier. The American Duesenberg, with a few minor changes in the engine such as the addition of a second carburetor, is said to be a duplicate of the regular passenger Duesenberg car.

Canadian Tariff Inquiry Off Until After Election

Because of possible political reaction the Canadian Tariff Board will postpone until after next month's election further hearings in its inquiry into the relation be-

Harlow H. Curtice, Buick president, center, and C. T. Scannell, general manufacturing manager, and J. T. Hammond, engine plant superintendent, examine the 3,000,000th Buick engine.



tween the tariff and prices of gasoline and the effect of the tariff upon the automobile industry.

The Board is said to hold the view that politicians might use statements made at the hearings in a manner that would bring the Board into a political controversy and that inability to complete the inquiry before the election might have an unfavorable reaction in the voting and prove prejudicial to interests which have not yet had an opportunity to be heard.

"All Honest Parts Genuine," New NSPA Sign Proclaims

The National Standard Parts Association has supplied jobber members with a display sign announcing the association's creed that "All Honest Parts Are Genuine"; it is 24 x 36 inches, lettered in black and red on a cream background. The statement, following the heading already quoted, reads:

"We subscribe to the creed that 'All Honest Parts Are Genuine.' Our business is founded on a reputation for honest service and honest merchandise. Our continued success, so closely related to your own, is dependent upon the maintenance of this reputation. The lines on our shelves, in anticipation of your needs, are the finest we can buy. They are made to the most exacting specifications by leading manufacturers, a great many of whose products are also sold to the car and truck makers. We stake our future on the firm belief that quality is king and we solicit your business on this basis."

At the bottom of the placard is the NSPA seal and the inscription—"We Are Members of National Standard Parts Ass'n."

J. Walter Thompson Co. Gets Nash Car Account

The J. Walter Thompson Company, advertising agency, Chicago, has been appointed by the Nash Motor Company, Kenosha, Wis., to direct its advertising activities. The Thompson agency has been handling the Lafayette account since Nov. 27, 1933, and is taking over the Nash account immediately. Frederick & Mitchell, formerly handling the account, is dissolving.

Motor Truck Show Space in Demand; Add Diesel Display

Demands for space at this year's Motor Truck Show to be staged in Newark, N. J., Oct. 30 to Nov. 2, far exceed the number of requests received at the comparative time for last year's exhibition, according to George H. Scragg, show chairman. Mr. Scragg said the committee in charge already is considering the possibility of adding extra show space to accommodate the exhibits. This year there will be added a display of the latest Diesel engine development and accessories, such as oil filters, air cleaners, tires, batteries and other equipment which have aided in making the modern motor truck the efficient machine it is.

The two day Regional Transportation Engineering meeting, sponsored by the Metropolitan Section of SAE, which will be held during the show, will give manufacturers and operators an opportunity to discuss their problems and get first hand information on operating problems vital to the success of a motor truck in meeting operating conditions found in the field.

Buick to Broadcast Baer-Louis Fight

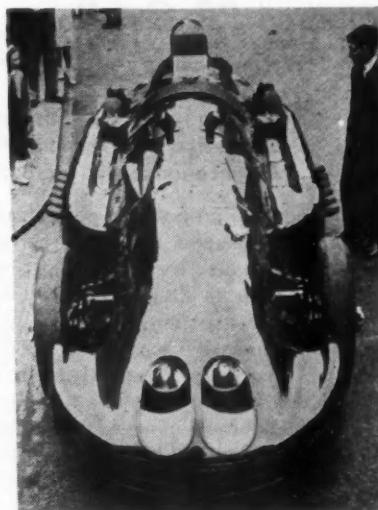
Buick Motor Co. will broadcast the heavyweight fight between Joe Louis, of Detroit, and Max Baer, former heavyweight champion, according to T. H. Corpe, Buick advertising director. The fight, to be held at

the Yankee Stadium on Tuesday, Sept. 24 at 10.00 p.m., E.D.S.T., will be broadcast exclusively under Buick sponsorship over the combined coast-to-coast NBC-WEAF-WJZ net work, including Canada and Honolulu.

A complete, blow-by-blow description to be given from the ringside by ace sports announcers, will be followed by a summary of the contest. The entire fight and summary will be broadcast regardless of the length of the bout.

M-H 4-Wheel-Drive Truck Pulls 21,730 lbs. in Test

One of the new Marmon-Herrington four-wheel-drive Ford V-8 trucks, the B5-4, with two-speed auxiliary transmission, was recently subjected to a road test under AAA observation. It was employed to haul a semi-trailer on which was loaded a track-laying vehicle, the gross weight of trailer and load being 13,720 lb. The truck itself was equipped with a supply-type body and weighed 7600 lb., including the weights of six men who comprised the crew. Thus the total weight of the train was 21,370 lb. The test was run over both state and national highways from Indianapolis south to New Albany and back, a total distance of exactly 250 miles. A total of 46 gallons of gasoline was used, giving a fuel mileage of 5.326 per gallon. The oil consumption was less than one ounce and the water consumption, 1.75 pints. The fuel economy factor figures out to 56.9 ton-miles per gallon.



Captain George Eyston's secretly built car with which he plans to attack existing long distance world records. The English driver will make his try on the Bonneville salt beds. The car is 23 ft. long and took six months to build.

Wholesale Financing for Seven Months Rises 38% Above Total for '34 Period

July reports from the Census Bureau on the dollar volume of wholesale financing continues to indicate the under-capitalized position of the industry's retail dealers as reported in *Automotive Industries*, of August 17. The January-July dollar volumes of financing in the wholesale field was \$896,509,151, a 38 per cent increase over the volume of the corresponding period of last year when the total reached \$648,715,971. This increase, of course, is largely due to the expanded sales of the current year over 1934. July's dollar volume of wholesale financing was 122,210,919, a gain of 33 per cent over the \$92,069,965

of the same month a year ago last year.

The increased vehicle sales of this year over 1934 are reflected in the dollar volume of retail financing for the first seven months of the current year. The total for the January-July period was \$435,230,940 against \$367,100,009, an increase of 18 per cent. While the total number of units sold during July was measurably greater than July, 1934, sales, the dollar volume of financing rose seven per cent, reversing the condition which existed in June when the retail financing dollar volume fell below that of the previous June despite an increased unit sale.

The accompanying table gives detailed comparative figures:

	July, 1935	June, 1935	July, 1934	1935	1934	Seven Mos., Seven Mos.
Wholesale financing	\$123,210,919	\$121,779,041	\$92,069,965	\$896,509,151	\$648,715,971	
Retail financing						
Dollar volume	\$119,784,582	\$111,893,982	\$99,630,687	\$692,999,177	\$555,403,669	
No. of units	325,840	303,334	265,147	1,878,974	1,490,338	
New vehicle dollar volume	\$74,463,285	\$69,409,989	\$67,034,990	\$435,230,940	\$367,100,009	
New vehicle units.....	134,014	126,207	123,552	799,037	665,714	
Per new unit	\$556	\$550	\$543	\$445	\$551	
Used vehicle dollar volume	\$43,701,283	\$40,459,144	\$30,805,120	\$245,650,874	\$178,149,657	
Used vehicle units	187,399	171,485	136,726	1,046,435	796,214	
Per used unit	\$233	\$236	\$225	\$235	\$224	

The balance amounting to 1.4 per cent of the units financed at retail is not classified between new and used cars.

White Co. Gets Cleveland Order for 20 New Buses

The Cleveland Railway Co. this week ordered 20 new trolley buses from the Pullman Standard Car Manufacturing Co. of Worcester, Mass., to inaugurate the first trolley coach service in Cleveland. The cost will be approximately \$250,000 for the coaches.

At the same time the company announced purchase of 20 new buses of the "pancake" motor type from the White Motor Co. to supplement present motor coach service, at a cost of approximately \$150,000.

Toledo Peace Board Made Permanent Organization

The Toledo Peace Board, mediating agency for labor disputes set up by the Toledo Plan for Industrial Peace, was made a permanent organization at a meeting held in Toledo last week. Edward F. McGrady, Assistant Secretary of Labor, and Ralph A. Lind, director of the eighth district National Labor Relations Board, meeting with the members of the Toledo peace panel, voted to maintain the Board, establish a permanent office and engage a secretary, paid by the government, to handle details and preliminary labor dispute arrangements before utilizing the services of the impartial general chairman.

Carpenter Joins Republic

John W. Carpenter, for 16 years district sales manager in the Cleveland, Ohio, territory for the Otis Steel Co., has joined the organization of Republic Steel Corp. as Assistant manager of sales, Sheet and Strip Division, according to N. J. Clarke, vice-president in charge of sales for Republic.

Proposed RR Gas Rate Cut Protested by ATA

Petition ICC to Suspend Suggested Lower Tariff As Economically Unsound

Suspension of proposed reduced railroad rates on gasoline and other petroleum products, effective Sept. 14, from California points to destinations in Oregon is asked in a petition filed with the Interstate Commerce Commission by the American Trucking Association, Inc., which joined its Oregon affiliate, Allied Truck Owners, Inc., in seeking to halt the rate cut. Request is made that the Commission hold a hearing and an investigation concerning the lawfulness of the proposed rates and that upon hearing the rates be ordered canceled.

The proposed tariffs, it is pointed out, purport to be for the purpose of meeting truck competition. The proposed rates are held to be unnecessary as a competitive measure, but are said to be a device to destroy the trucking industry. The petition explains that since the passage of the Motor Carrier Act the Commission has the same obligation to promote sound economic conditions in both motor and railroad transportation on the basis of their respective merits as transportation agencies under the circumstances and conditions of each class of operation and services, and for each class of commodity.

Explaining that motor carriers must file tariffs under the new Motor Carrier Act, the petition said that the tariffs should bear a proper relation to the cost and value of the service and to the inherent advantages of the method of transportation.

Willys-Morrow Auction Postponed to Oct. 19

Bondholders and creditors of the Willys-Overland Co. and all creditors of the Willys-Morrow Co., Elmira, N. Y., have been notified by David R. Wilson, receiver, that the public auction of the Elmira plant with all machinery, fixtures and equipment will be held, Oct. 19, rather than the previously announced date of Sept. 28.

The original notice of the auction fixed the minimum sale price at \$300,000 and announced that sale of the property is subject to confirmation by the United States District Court for the northern district of Ohio, western division. These provisions continue to prevail.

Spicer Co.-MESA Sign New Contract for 1 Yr.

The Mechanics Educational Society has obtained a new contract for its 600 members in the Spicer Mfg. Corp. plant in Toledo, in which wage increases of 3 to 13 cents per hour was granted, together with overtime and holiday bonuses and the 40-hour week continued. The new Spicer contract signed with the U.A.W. Federal Union, an

A.F.L. affiliate, whereby members of that union were granted pay increase of 5 per cent, was reported in the Aug. 31 issue of *Automotive Industries*. Both contracts are for a year.

The M.E.S.A. also reports an agreement with Motor Products Corp. which provides for an increase of 5 cents an hour in the wage rates of tool and die workers. The association has 230 members in that plant. A similar increase was obtained at Zenith Carburetor Co. for the association's 41 members in that plant. Matthew Smith, general secretary of the M.E.S.A., said that hourly rates for tool and die workers in the Detroit area are now 10 per cent higher than in 1929, although weekly earnings are not as great because of a shorter week.

Studebaker Ships 44-Car Train of Vehicles Abroad

Studebaker last Monday shipped 163 automobiles to London. The shipment comprised a single trainload of 44 freight cars and was the largest single trainload shipment of automobiles ever to leave South Bend over the Pennsylvania Railroad. The shipment is consigned to Studebaker Distributors, Ltd., London, English distributors for the Studebaker Export Corporation and one of the largest automobile distributors in the world.

E. W. Smiths Have Son

A son was born Sept. 9 to Mr. and Mrs. Edgar W. Smith. Mr. Smith is vice-president of General Motors Export Corp.

Buick Boosts '36 Production Schedule 50% Over '35; To Build 135,000 Cars

"We are planning to produce 135,000 cars between now and September, 1936," Harlow H. Curtice, president and general manager of Buick Motor Co., announced prior to the opening of a sales convention at the company's headquarters in Flint, during which the company's more than 3000 dealers will be acquainted with plans for 1936 sales. Public announcement of the company's new line will be made later in the month.

"Our scheduled output for the coming year will compare with production of roughly 90,000 cars in the calendar year 1935, 65,000 in 1934, and 40,000 in 1932," Mr. Curtice said. "We already are producing 400 cars a day, which is the rate at which our plants operated at the peak of the spring season this year."

Mr. Curtice said that production would be increased to 650 cars a day by the end of the month, by which time 13,000 or more cars will be in dealers' hands. More than 3000 cars have been manufactured and are en route to dealers.

To reach the quota set for the coming year, W. F. Hufstader, vice-president and

Automotive Takings Boost Steel Output

Negotiations Under Way for Heavier Deliveries During Next Four Weeks

Automotive takings of steel continue to be the principal factor in enabling the steel industry to operate at around one half of its rated ingot capacity. The American Iron and Steel Institute reports this week's employed capacity at 49.7 per cent, the best record in seven months.

Demand for pig iron from automotive foundries has attained proportions that may be put down as the "priming of the pump" in that market, so long dormant. A good deal of business overhangs the Detroit steel market, parts makers and forging plants having expanded their production schedules and initiated negotiations for heavier steel deliveries over the next four weeks. Automotive alloy steel specialists are stepping up their rate of output. Some good sized transactions in bolts and nuts are reported to have been consummated, rumors of price concessions in some of these having been heard. On the whole, prices come in for very little mention. In some quarters emphasis is laid on the theoretical possibility, under the changed marketing methods, of a price rise in the

general sales manager, speaking on the opening session of the sales convention, set a sales objective for the next four months of one unit delivered during that period for each car sold during the last eight months.

The opening day's session of the convention was given over to the presentation of the line to the company's field organization. At this session, the speakers included Mr. Hufstader, F. A. Bower, chief engineer; Harlow H. Curtice, president, and Arthur Kudner, new advertising counsel, whose speech was greeted with tremendous enthusiasm. At the banquet which closed this session, there was an imposing array of GM officials, the feature addresses being made by R. H. Grant and W. S. Knudsen, respectively vice-president and executive vice-president of GM.

Beginning Tuesday and continuing until Wednesday of next week, groups of dealers are being brought in from all parts of the country for one day sessions.

This is the first time in several years that the entire dealer organization of Buick, together with distributors zone and regional managers, has been assembled in Flint for the large-scale planning and preparation of a sales year.

Machine Tool Show of 1935 Mirrors Industrial Progress

by Joseph Geschelin

Detroit Technical Editor,
Automotive Industries

Relations between steel producers and automotive consumers, however, have never been more amicable than they are right now, and there is little likelihood of any steel seller assuming an arbitrary attitude toward his customers. If the upward spiral continues in the same direction, there is little doubt that here and there somewhat more profitable prices will be on the wish list, but there certainly will be no attempt made to realize these over night. Sheet as well as strip specifications continue to come through at a satisfactory rate. To the other basing points for strip steel there has now been added Gary, Ind.

Pig Iron—The movement of pig iron to automotive foundries has broadened impressively. Middle West markets reporting much quickened activity. More and more idle blast furnaces are going into production. Fourth quarter prices are entirely unchanged.

Raybestos-Manhattan, Inc. Acquires Multibestos

Following negotiations, disclosed last week, the manufacturing equipment, patents, trade marks, good will, etc., of the Multibestos Division of Dewey and Almy Chemical Company, manufacturers of Multibestos brake linings and clutch facings, exclusive of replacement inventory, have been acquired by Raybestos-Manhattan, Inc.

It is announced that Multibestos brand material, built to the same standards and formulas that have prevailed in the past, will continue to be available from Raybestos-Manhattan, Inc.

AFL Lodges Discrimination Charges Against Fruehauf

Complaint has been filed with the National Labor Relations Board by counsel for the AFL against the Fruehauf Trailer Co. charging violation of section 8 of the National Labor Relations Act involving discrimination by the company in discharging employees who are members of the union for union activity.

Dunlap Joins Adv. Agency

Franklin Dunlap, who has served such concerns as Inland Manufacturing Co., Waco Aircraft and Dayton Rubber Manufacturing Co., as an advertising agency account executive and Diamond State Fibre Co., as advertising manager, has joined the staff of Sidener VanRiper and Keeling, Inc., Indianapolis, advertising agency.

Son Born to Denhams

Mr. and Mrs. Athel Denham are receiving congratulations on the birth of their second son, Alexander Roger, who arrived last week. Mr. Denham was formerly Detroit Editor for the Chilton publications and now has a consulting advertising service in Detroit.

Tuesday, Sept. 10, was pre-view day in Cleveland, signalizing the beginning of the 1935 Machine Tool Show. It was a day set apart for a distinguished group of guests including leaders in the fields of industry, finance, education, and editors of business and technical publications.

At the risk of lapsing into superlatives we are moved to say that this is undoubtedly the greatest single-industry exposition ever assembled in this country, and it is held by some to be larger than the international exhibits at Olympia. Regardless of the statistics, this exposition is truly an inspiring spectacle and is calculated to excite the imagination of any mechanically minded person who enters the gate.

No automotive factory executive, no automotive financial executive, no mechanically-minded person can afford to miss this show. Here is an opportunity to see under one roof the sum total of an epoch in mechanical development and inventive genius. Much of the equipment shown is so new that even at this writing no descriptions or photographs are available. But it's here and operating on practical set-ups.

Take our word for it, it's worth any man's time and carfare. And it represents the best investment that any manufacturer can make.

Exhibits Are Striking

The production and Factory Equipment Issue of *Automotive Industries* of Sept. 7, gave you a pretty good sample of what is being shown. However, there are a number of striking pieces of equipment on the floor that have not been described anywhere because they were set up for the first time when the show opened. Much of this, where it concerns automotive factory men, will be shown in *Automotive Industries* next week.

We have mentioned in the past something about the new order of machine design. Let us say that the evidence presented surpasses any general statements we may have made. In general, all of the new machines have been cleaned up and are particularly handsome. They are massive, heavy, and yet so easy to handle.

Perhaps the most striking feature is the decided trend to a combination of hydraulic and electrical controls. This is evident on many makes and takes in the largest as well as the smallest units.

The new machines have a distinctive grace and beauty associated with a shopman's idea of what a machine should be. The machines are inherently precise in adjustment and designed to produce work with a high order of dimensional tolerances. Faster

speeds, greater accuracy, ease of handling all contribute to a new conception of mechanical perfection and further economies in production cost.

Among the new items found at the show for the first time we might mention the following few:

Cincinnati Milling is showing a new die sinker combining hand and automatic tracer movements. It's set up to produce a crankshaft die with hand movement for the contour and automatic tracer control for cavity form and depth. Several car builders have ordered this machine without seeing anything but the blue prints.

Avey is showing a hydro-electric drill line which looks like the answer to crankshaft drilling. In fact we are told that a prominent car builder has installed a complete line for 1936 production.

Heald has a lot of new stuff. One particularly striking job is the production of a large aircraft cylinder liner (of unusual hardness) by internal centerless grinding. The O.D. is ground on a centerless machine; then the bore is ground on a big internal centerless. The finish is superb; and the wall thickness is held to a very low tolerance.

Sellers features many interesting machines but the thing that intrigued us was a double-action planer tool on their new big-sized planer. The tool cuts forward, then tilts in the opposite direction to cut on the return stroke. This unique device just doubles the productivity of the huge planer.

DeVlieg sprang a surprise in showing one of a battery of the novel turn-milling machines built for Spicer. This is the machine that turns the shaft of the ring wing by climb milling. Operation is completely automatic including an electrically controlled hand that picks up the work and sets it into the work-station. Here is an entirely new way of removing metal.

Foot-Burt shows a five-way drilling machine built for a certain very large car maker. It drills all the holes in all the faces of the cylinder block simultaneously.

Ex-Cell-O gives you their version of the modern cylinder boring machine. We described the two-way machine used by Ford in a recent issue of *Automotive Industries*. The new machine is suitable for any conventional block and in fact it has attracted the attention of a number of large engine producers.

Peter Hall has a very tricky little Planetary machine for small work. Just the thing for many parts makers.

George Gorton shows several sizes of the new Duplicator for producing small dies for every purpose. It's said to be very fast, accurate, and economical.

So much for that. We'll try to give you a more complete report next week.

Watson Dinner Speaker

The pre-view dinner at which the principal speaker was Thomas J. Watson, president of International Business Machines and Ralph E. Flanders, president of Jones & Lamson Machine Co., was toastmaster, was held on Tuesday night.

Jan.-July Dollar Volume Reflects Year's General Uptrend With 39.9% Increase

U. S. New Car Registrations and Estimated Dollar Volume by Retail Price Classes—Seven Months

	UNITS			ESTIMATED DOLLAR VOLUME*		
	1935	1934	Per cent Change	1935	1934	Per cent Change
Chevrolet, Ford and Plymouth	1,208,792	891,005	+35.5	69.21	72.81	\$745,000,000
Others under \$750	248,814	59,147	+320.0	14.24	4.83	117,700,000
\$751-\$1000	228,778	217,404	+5.2	13.10	17.77	198,700,000
\$1001-\$1500	47,637	37,542	+27.0	2.73	3.07	56,400,000
\$1501-\$2000	4,572	9,161	-50.0	.26	.75	7,700,000
\$2001-\$3000	5,443	6,969	-22.0	.31	.57	15,000,000
\$3001 and over	2,647	2,463	+7.4	.15	.20	11,100,000
Total	1,746,683	1,223,691	+42.9	100.00	100.00	\$1,206,600,000
Miscellaneous	452	190	+238.0			
Total	1,747,135	1,223,881	+43.0			

*All calculations are based on list price F. O. B. factory of the five-passenger, four-door sedan in conjunction with actual new car registrations of each model. The total dollar volumes for the different models are then consolidated by price classes.

July New Cars Up 24.7%; Dollar Volume 23.7%

U. S. New Car Registrations and Estimated Dollar Volume by Retail Price Classes—July

	UNITS			ESTIMATED DOLLAR VOLUME*		
	1935	Per cent 1934	Per cent Change	1935	1934	Per cent Change
Chevrolet, Ford and Plymouth	195,103	168,330	+16.1	68.42	73.59	\$116,600,000
Others under \$750	42,723	6,603	+548.0	14.98	2.89	30,300,000
\$751-\$1000	37,153	45,888	-19.0	13.03	20.06	31,400,000
\$1001-\$1500	8,905	5,071	+75.3	3.12	2.22	10,300,000
\$1501-\$2000	166	1,215	-86.5	.06	.53	300,000
\$2001-\$3000	814	1,249	-34.9	.29	.55	2,300,000
\$3001 and over	297	378	-21.5	.10	.16	1,300,000
Total	285,161	228,734	+24.7	100.00	100.00	\$192,500,000
Miscellaneous	34	26	+30.8			
Total	285,195	228,760	+24.7			

*All calculations are based on list price F. O. B. factory of the five-passenger, four-door sedan in conjunction with actual new car registrations of each model. The total dollar volumes for the different models are then consolidated by price classes.

Germany Builds More Plants to Make Gasoline from Coal

Three additional large plants for the manufacture of gasoline from coal by hydrogenation are under construction in Germany and are expected to begin operations during the last half of 1936. One of the plants is being erected by the Hydrierwerke A.G., a creation of the Prussian State collieries, with headquarters at Gelsenkirchen in the Ruhr district and a capital of 10 million marks. In this plant the improved process of the German dye trust (the Bergius process) will be used. A second plant is being erected by a company sponsored jointly by Ruhrchemie A.G. and the Ruhr collieries. This company was originally organized to produce synthetic nitrogen, but it is now also getting ready to produce gasoline by the hydrogenation process. The hydrogenating process of Professor Fischer is to be employed in a plant that is being erected by private collieries.

It is expected that each of the three plants under construction will be able to turn out 25,000 tons of coal gasoline per year, which may later be increased to 30,000 tons, so that the combined production will be 90,000 tons. Germany at present imports roughly one million tons of gasoline per year. In addition to the three projects referred to above, efforts are being made also to produce motor fuel from lignite, and plants for the production of gasoline from lignite are being built by the Braunkohle Benzin Gesellschaft at Doeblen near Leipzig and near Magdeburg.

Dr. McClintock to Address Safety Council Meeting

Dr. Miller McClintock, director of the Bureau of Traffic Research, Harvard University, will speak on "Safe Cars and Safe Highways" at the National Safety Council meeting in Louisville, Ky., October 14.

Young Corp. Completes New Chicago Factory

Construction of the second branch plant of the Young Spring & Wire Corp., to be located in the Clearing Industrial District, Chicago, has been completed. The Star Service Hanger Co., a Young subsidiary, has been located there since 1929.

The new branch will be given over to the Young's high carbon steel coil springs for the Illinois, Indiana, Wisconsin and other mid-western and western automobile, mattress and furniture centers. The new plant will employ a force of about 400 men and women.

Vote on Steel Co. Merger

A special meeting of stockholders has been called by the directors of Inland Steel Company, Chicago, for Sept. 20, to obtain formal approval of the merger with Joseph T. Ryerson & Son, Inc.

ASA Poll Under Way on Motor Vehicle Inspection Standardization Project

A large number of replies to the letter-ballot mailed to members of the Conference on Motor Vehicle Safety Inspection recently have already been received. All of the replies so far have been in approval of the recommendations of the steering committee, but a few replies from important groups are yet to be received.

The ballots, which were sent out by the American Standards Association, 29 West 39th Street, New York, enclosed copies of the minutes of the July 11, 1935, meeting of the steering committee, with the question, "Shall the report of the Steering Committee, including its recommendations on the scope, sponsorship and organization of the project on Standards for the Inspection of Motor Vehicles be approved and recommended for official adoption by the American Standards Association?" Members were also asked to signify if they would prefer to have the General Conference reassemble for discussion and action on the report of the Steering Committee, and if so, to give their reasons.

The steering committee was appointed at a general meeting held last May 10 and which was widely attended by representatives from interested groups. It includes representatives from fifteen groups interested in promoting increased safety of motor vehicles. S. J. Williams, of the National Safety Council, is chairman. After discussion, it was unanimously resolved that the following scope be adopted: "Performance requirements and methods of testing with relation to the safe operation of motor vehicles on the highways of those parts and equipment, such as braking systems, steering mechanisms, lighting systems, frames, wheels, tires, other parts and equipment, the proper performance of which bears a distinct relationship to the safe operation of the motor vehicle."

After a discussion as to whether the standards which were to be developed should be minimum standards, ideal operating requirements, or whether they should consist of graded ratings, it was resolved that "the committee recommend that the sectional committee give consideration, wherever feasible, to the creation of dual or tri-partite performance requirements which may be classified under the headings of 'Non-acceptable', 'Acceptable', and 'Desirable'."

The committee recommended that the following three organizations be requested to act as joint sponsors for this project: American Association of Motor Vehicle Administrators; National Bureau of Casualty and Surety Underwriters; and Society of Automotive Engineers.

If the recommendations of the Steering Committee are finally approved, the approval will be referred to the Standards Council of the American Standards Association, and the project will probably be initiated. Then the sponsors will be asked to meet to or-

ganize the general (or sectional) committee, sub-committees, and other specialized committees, each of which will be assigned some specific task and will be asked to report back to the Sectional Committee. The final report, as edited and revised by this committee, will be submitted to the Standards Council. When this is adopted, it will automatically become an American Standard, and will be published and distributed.

NSPA Announces Tentative Convention, Show Program

The tentative program of the 1935 NSPA Convention and Automotive Service Industries Show, scheduled for Atlantic City, Dec. 3 to 13, has been announced by the association. Committee and board meetings not attended by the general membership occupy the first three days of the schedule. The convention sessions at which NSPA members' attendance is required will be held Friday and Saturday, Dec. 6 and 7, prior to the opening of the show, Monday, Dec. 9.

Tuesday, Dec. 3, 10:00 a.m. Marketing Research Committee; 10:00 a.m. Membership Committee; 4:00 p.m. Finance Committee.

Wednesday, Dec. 4, 10:00 a.m. Wholesalers' Board of Governors; 10:00 a.m. Manufacturers' Board of Governors.

Thursday, Dec. 5, 9:00 a.m. Registration opens at Ambassador; 10:00 a.m. Board of Directors; 7:00 p.m. Administration Dinner for present officers and directors.

Friday, Dec. 6, *10:00 a.m. First General Session; *2:00 p.m. Wholesalers' Divisional Meeting; *2:00 p.m. Manufacturers' Divisional Meeting; *8:00 p.m. Wholesalers' Divisional Meeting.

Saturday, Dec. 7, *10:00 a.m. Second General Session; *2:00 p.m. Final General Ses-

sion (Election and installation of new officers and directors); 7:00 p.m. Old Timers' Dinner for N.S.P.A. present and past directors.

Sunday, Dec. 8, 1:00 p.m. Wholesalers' Technical Session; 6:30 p.m. International Automotive Booster Clubs buffet supper, Hotel Madison.

Monday, Dec. 9, *9:00 a.m. to 5:00 p.m. Show. Open only to members of sponsoring associations and overseas guests.

Tuesday, Dec. 10, *9:00 a.m. to 5:00 p.m. Show. Open only to members of sponsoring associations and overseas guests; 12:15 p.m. Wholesalers' Board of Governors Luncheon; 12:15 p.m. Manufacturers' Board of Governors Luncheon; 8:00 p.m. Salesmen's Convention Session sponsored by N.S.P.A. for ALL jobber and manufacturer salesmen and their employers.

Wednesday, Dec. 11, *9:00 a.m. to 5:00 p.m. Show. Open only to members of sponsoring associations and overseas guests; 12:15 p.m. Board of Directors Luncheon; 6:30 p.m. Overseas Club Dinner (hotel to be selected).

Thursday, Dec. 12, 9:00 a.m. to 5:00 p.m. Show. N.S.P.A. attendance optional—Show open to invited jobber guests.

Friday, Dec. 13, 10:30 a.m. to 11:00 p.m. Show. N.S.P.A. attendance optional—Show open to invited jobber guests, invited manufacturer guests and to the entire maintenance trade.

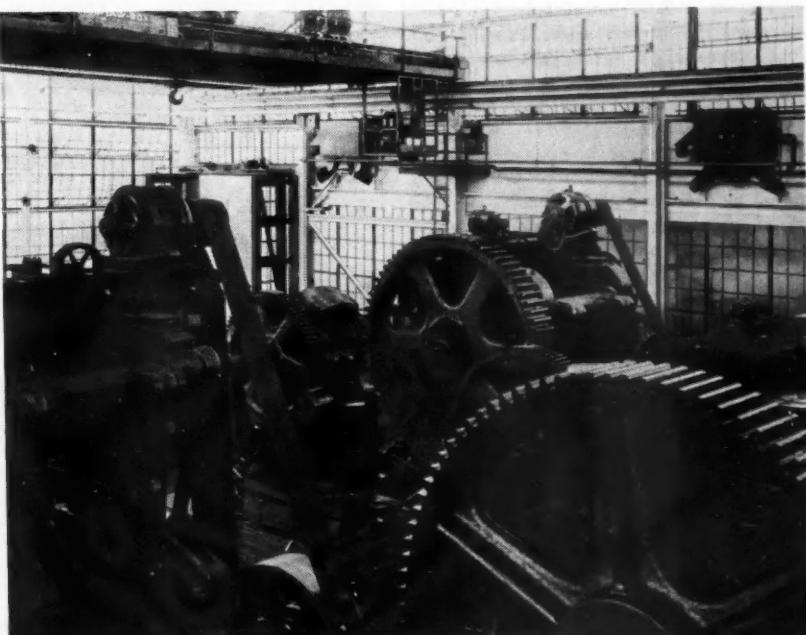
To be eligible for N.S.P.A. transportation and per diem refunds "In" and "Out" coupons must be properly deposited at each of the sessions indicated by an asterisk (*). All meetings will be in the Ambassador Hotel unless otherwise specified.

Studebaker Will Raze Old Buildings

Forty-four obsolete buildings of the Studebaker Corp. will be razed, work on which started Monday. Some of the old buildings were where the famous Studebaker wagon was built that carried the name of Studebaker throughout the world.

More Job Insurance Laws

Unemployment insurance laws have now been enacted by seven states—California, North Carolina, New York, Utah, Washington, New Hampshire and Wisconsin.



This view of these gigantic presses in one of the new buildings erected by Chevrolet during its expansion of the Detroit plants was taken from a balcony encircling the room. The building is devoted exclusively to heavy machinery used in making metal stampings

Must Protect Business From Hazards of Discriminatory Taxation, Sloan Says

The need for adequate protection for business today from the hazards of the political tendency to penalize "business bigness through discriminatory taxes and otherwise" was stressed this week by Alfred P. Sloan, Jr., General Motors president, in a letter sent to all stockholders with the regular dividend checks.

"The most important point I want to make," Mr. Sloan wrote, "is that General Motors' stockholders can rely upon the directors to pass on the largest possible share of the earnings consistent with the needs of the business. Other considerations, such as essential progress of the business, the maintenance of an efficient and effective plant, an aggressive organization, and adequate protection against such hazards as the political tendency to penalize business bigness through discriminatory taxes and otherwise, are in times like these very real and must be given proper consideration as applied to any business."

Mr. Sloan stated that "the regular dividend declared today represents a rate of disbursement two-thirds of that of the pre-depression period." He explained the directorate's recent action increasing the dividend rate from 25 cents to 50 cents per share by quoting from his statement issued at the time the rise was announced. Then Mr. Sloan said that a dividend rate "should be as generous as possible . . . while at the same time reflecting the financial position of the corporation, the current rate of earnings, and the future trend, so far as that can ever be discerned." However, in a later paragraph Mr. Sloan emphasized that today, under existing conditions, appraisal of future business trends is difficult, because "there is involved unusual certainty. This must be appreciated by the stockholders."

Pointing out that it is neither desirable nor possible over a period of years for a business to pass out all its earnings in the form of dividends, Mr. Sloan said there are times when conditions arise making it "entirely justifiable and to the interest of the stockholders to pay out in any one year more than that year's earnings. General Motors, during the depression . . . did that very thing—as a result, it was able to maintain payments to stockholders during the entire depression. . . . When the amounts we are dealing with are large, as in the case of General Motors, an appreciable contribution is made in maintaining the purchasing power of the community. This is a highly desirable consideration as the public is importantly served."

For the 10 year period beginning in 1925 and ending in 1934, Mr. Sloan said in his letter, a period representing five years of unusual prosperity and five years representing an unusual depression, stockholders received 77 per cent of the corporation's earnings, the remaining 23 per cent being

reserved for the purposes of the corporation. In the first five years of the period the proportion disbursed as dividends was 63 per cent, for the second five years it was 113 per cent.

AFL and AAWA in Membership Race

(Continued from Page 345)

City which starts Oct. 7 and may last two weeks. Observers say this convention will test the strength of the Federation's new International Union of Automobile Workers since the issues that split the new organization are being carried to the floor of the Atlantic City convention. A committee of seven was named in Detroit to appeal William Green's action in naming officers of the new union and the Federation's ruling excluding existing craft unions from the new organization which set out to be an industrial union, but in reality is itself only a craft union comprising only production workers.

First day of the AAWA convention will be in the nature of an open forum with all workers invited to express their ideas. Invitations to attend will be sent to other groups including various bargaining agencies set up by the ALB elections last spring. A business meeting will be held the second day. Since the AAWA was chartered a year ago, election of officers will come up.

The AAWA claims a membership of approximately 30,000 automotive employees in about a dozen locals in Michigan and Massachusetts. This includes three Michigan locals which are to be given charters at the convention next month. Principal locals are at the Hudson and Plymouth plants, each

with a membership of upwards of 4,000 workers. Other important units are at the Olds and Fisher plants in Lansing. An affiliated and autonomous group, known as the Automobile and Garage Workers of America, Inc., with locals of its own in Massachusetts was granted a charter last spring. The AAWA is one of the principal units of the newly formed Brotherhood of Allied Automobile Organizations, a federation of autonomous unions in the motor industry formed by the Officers' Association of Automobile Industrial employees which was composed of officers of the bargaining agencies set up by the Wolman Board.

A new element was injected into the membership scramble among automobile unions this week by the receipt of an invitation to the Mechanics Educational Society to join a new industrial union with headquarters in New York City. The invitation came from the Federation of Metal and Allied Unions consisting of 23 independent labor groups which, it is understood, plan eventually to affiliate with the AFL, although retaining autonomy. Matthew Smith, executive secretary of the MESA, said that it was the policy of the MESA to meet with any legitimate labor group to see if collaboration is possible.

Store-Door Pick-Up Not RR Service, ATA Charges

Store-door pick-up and delivery is not a railroad service and when railroads engage in such activity they are not extending a railroad service subject to the provisions of the Interstate Commerce Act, according to a critical analysis of the measure recently made and released by the American Trucking Association, Inc. Rather, the association points out in its analysis, railroads are engaging in a distinct business and enterprise not subject to the direct jurisdiction of the ICC when carrying on a store-door pick-up delivery service.

The analysis, made by J. N. Beall, counsel

Loaded Chevrolet Truck Climbs



Harry Hartz, foreground, and newspaper men flag truck over summit

for the ATA, charges that a grave administrative error was made when railroads were permitted to engage in this service and that about \$10,000,000,000 of worthless railroad securities and inter-rail competition are the underlying causes for invading the trucking field.

Taking the figures of Mr. Eastman, Federal Coordinator of Transportation, Mr. Beall estimates in the analysis that \$20.67 is lost on every ton of originated freight on which store-door service is furnished free. The railroads are charged with losing business because they did not have the equipment to handle all the business "because they elected to furnish cars for the more profitable carload business." This, it was stated, causes the l. c. l. shipper to provide his own transportation "which he did, either by purchasing trucks or employing for hire truckmen."

Worden Heads Pontiac's Mass Selling Department

Howard T. Worden, who has been an assistant to Pontiac Motor Co.'s advertising manager, Frank A. Berend, has been appointed head of the company's new mass selling department.

Mr. Worden will have under his supervision the pre-selling activities of the merchandising program including automobile shows, moving pictures, stunts and all ideas which are intended to bring people into dealers' salesrooms.

Ford Denies Small Motor Rumor for Domestic Car

Reports that Ford Motor Company was in production on a new small motor which would be used in a car for the domestic market are denied by the company which points out that these engines are being built for export to France.

NADA Reports Dealer's Net "Operating" Profit One-Half Cent on Dollar Volume

A net "operating" profit of one-half cent to the dollar volume of business is reported for 473 car dealers handling all makes of cars in Sept. 10 issue of the *NADA Bulletin*. The dealers' association has made the report following completion of a preliminary study of totals compiled from the 1934 operating statements of the dealers who have reported in the NADA's second special trade survey.

The *Bulletin* points out that this narrow margin is "only the operating profit in all departments, derived by subtracting the total expense from the gross profit." Each dealer has sources of income other than the sale of cars, such as cash discounts, interest, junk, etc., which are outside the sale operation. However, says the *Bulletin*: "When these are added and subtracted, a final net profit of seven-tenths of one cent to sales volume is left for the dealer reporting in this group."

According to the NADA the major stumbling block to the desired 5 per cent profit, a goal set many years ago, is the used car operations, "which . . . almost absorbs the profits of all the departments of the business." The reports in this second survey, says the *Bulletin*, have come from a group of dealers "far above the average . . . and when statements from the mass of smaller dealers are included, it is probable that the actual conditions will reveal a more deplorable situation."

The first study of this nature reported by NADA was last July and was made on the statements of 359 dealers. At that time, according to this recent release, the net

loss in the new and used car departments was \$14.76 per new car unit. This figure, according to NADA, remains unchanged with the additional 114 operating reports.

"In the current, or second study," the *Bulletin* says, "the sales in all departments of the 473 dealers reporting, totaled \$137,463,579. The cost of the sales totaled \$112,184,084, leaving a gross profit of \$25,279,495, or 18.39 per cent of the total sales."

It is reported by NADA that of this \$25,279,495 gross profit total expenses took 97.01 per cent. Of this percentage payrolls, including salaries, commissions and bonuses, took 49.7 per cent, (commissions and bonuses accounting for 14.5 per cent; salesmen's salaries, 3.5 per cent, a total of 18 per cent); delivery expenses, 2.2 per cent; installation of accessories, etc., 0.3 per cent; guarantee, 4.7 per cent; new car advertising, 2.3 per cent; owners and officers salaries, 8.3 per cent; salaries for supervision, 8 per cent; clerical salaries, 5.6 per cent; other salaries and wages, 9.8 per cent. The balance was represented by miscellaneous expenses such as demonstrations, rents, office supplies and similar items incident to the conduct of a modern dealership.

GM 1935 Stockholders Triple 1929 Number

The number of persons holding General Motors common and preferred stocks during the third quarter of this year were more than three times the number of shareholders the corporation had on its books in 1929 and only a fraction less than five times greater than the total number in 1928.

The total number of GM stockholders for the third quarter this year was 345,004, compared with 351,275 for the second quarter and with 349,524 for the corresponding period last year. Common stockholders for the quarter numbered 325,430 and the remaining 19,574 were preferred holders.

Eight Months' Output Estimated at 2,966,000

(Continued from Page 345)

last year and comparing with registrations of 336,438 cars and trucks in July, which figure was about 11 per cent above actual sales.

If the August ratio of motor vehicles produced for the domestic market remains the same as in July—87 per cent—then roughly 211,000 units were produced for sale in this country, indicating a reduction in dealer's stocks of 79,000 units last month. With September production likely to fall well under 100,000 units, a more substantial reduction in stocks can be expected this month, since a corresponding drop is not expected in retail sales.

Pike's Peak in 37 min., 57 sec.



The 1 1/2 ton truck nears the top of the world's highest roadway

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

There was a moderate recession in general business activity last week, which is attributed largely to the unfavorable weather in many sections of the country. Wholesale business was smaller, and the heavy industries were less active, but retail trade continued to gain.

Car Loadings Continue Increase

Railway freight loadings during the week ended August 31 amounted to 679,861 cars, which marks an increase of 53,488 cars above those during the preceding week, a gain of 32,330 cars above those a year ago, and an increase of 6083 cars above those two years ago.

Railroad Operating Income Lower

Net operating income of Class 1 railroads during the first seven months of this year was at the annual rate of return of 1.69 per cent on their property investment. The rate in the corresponding months of 1934 was 1.99 per cent.

Current Production Remains at High Level

Production of electricity by the electric light and power industry in the United States during the week ended August 31 was slightly below that in the preceding week but was 11.2 per cent above that in the corresponding period last year.

Lumber Business Tone Healthier

With the exception of the pre-strike weeks in April, new business booked at the lumber mills during the week ended August 24 was the heaviest for any week this year. The total was about 8 per cent above that in the preceding week, while production and shipments were maintained at about the same high levels as in the week before.

Estimate 500,000 Tires Rebuilt, Retreaded Yearly

Tire rebuilding and retreading has grown to such an extent in the last two years that the trade estimates present annual production at approximately 5,000,000 automobile casings, according to a study made by E. G. Holt, acting chief of the Leather and Rubber Division of the Department of Commerce.

It is stated that tire retreading in all probability will have a noticeable influence on crude rubber consumption in the United States and eventually throughout the world, but the extent of this influence is not yet measurable in exact terms. Since retreads however use only about one-half as much rubber, on the average, as new tires, the effect might be estimated to amount to roughly 10,000 tons of rubber on an annual output of 5,000,000 retreads in the United States.

Farm Price Index Shows Rise

The index of farm prices on August 15 stood at 106, as against 102 a month earlier. The increase was due largely to the rise in the prices of wheat and hogs. Prices of 28 farm commodities were below those a month earlier, and meat animal prices were 61 points above those a year ago.

Crude Oil Output Fluctuates

Average daily crude oil production for the week ended August 31 amounted to 2,665,100 barrels, as against 2,688,700 barrels for the preceding week and 2,422,150 barrels for the corresponding period last year.

Irving Fisher's Price Index

Professor Fisher's index of wholesale commodity prices during the week ended September 7 stood at 84.5, as compared with 84.3 the week before and 84.6 two weeks before.

Federal Reserve Bank Statement

The consolidated statement of the Federal Reserve banks for the week ended September 4 showed a decline of \$1,000,000 in holdings of discounted bills. Holdings of bills bought in the open market and of government securities remained unchanged. Money in circulation increased \$77,000,000, and monetary gold stocks increased \$12,000,000.

When the International Rubber Regulation Agreement became effective in 1934, it was predicted that unforeseen developments would occur that would have a marked influence on its success. Tire retreading, with its economy and lower consumption of rubber, appears to be the first noticeable development in consumption which might have its influence on the restriction scheme. This development is, however, not expected to become of comparable importance in the present restriction scheme to reclaimed rubber in the days of the Stevenson Restriction Scheme of 1922-1928.

New Process for Welding Aluminum Alloy Developed

A new process for welding aluminum alloys, such as RR 56 and duralumin, has been developed in Great Britain, according to U. S. Consul William W. Heard of Bir-

mingham. The new welding material, known as alusol, will join aluminum in cast, rolled, sheet or tube form, and fluxes freely at 350 deg. F. Test pieces of RR 56 and hydumium tubing socketed together and joined with alusol were pulled apart only under a stress of 26 tons per sq. in., and then the joint remained intact.

Alusol is claimed to be resistant to corrodin influences and to be unaffected by aging. An immediate application is in connection with a bicycle frame entirely of light alloy, which weighs only 4.75 lb. It is believed that the new method opens up important possibilities in the automobile and aircraft industries.

Trade Mark Registration Denied Bus, Truck Operator

Affirming a decision of the examiner of trade marks, Richard Spencer, first assistant commissioner of patents, has denied an application of Jerry C. Pugh, New York, to register a trade mark for trucks, automobiles and horse-drawn vehicles, holding that the mark is not registrable because the applicant's business consists merely in rendering a service. In denying an appeal made from the examiner's decision, Mr. Spencer said that the goods described in the application are improperly described and that it appears the applicant is engaged in the business of transportation for hire and to this end operates trucks or vans.

Citing cases to support the decision, Mr. Spencer declared that it is deemed to be settled that an applicant in order to be entitled to registration must apply the mark physically to a vendible commodity and place the commodity on the market.

New Tire for Farm Service Developed by Goodrich Co.

A new pneumatic tire for farm service, the R-4, has been announced by the B. F. Goodrich Co. as ready for national distribution. It is made in practically all sizes required for farm tractor wheels. The tread now has 38 per cent more rubber, and this additional rubber is said to increase the life of the tire 35 per cent. The tread is of a self-cleaning design; it throws out mud and will not plug up and lose traction, according to the manufacturer. Side walls are protected against scuffing when working in furrows or over loose soil. Shoulder cleats are made wider, to prevent rapid wear on the shoulders and resist snagging on rough stubble or roots. An arrow on the side wall of the tire indicates the direction in which the tire gives the best traction.

Gasoline Substitute Use Made Mandatory in Italy

According to a decree just issued in Italy, after Dec. 31, 1937, all vehicles used for the transportation of passengers (for hire), in town or country, public or private, must be propelled by engines operating on charcoal gas or gasoline substitutes. It is forecast that the principal gasoline substitute will be beet sugar alcohol.

Autocar Enters Four-Wheel-Drive Field With Three Models; List \$5,000 to \$7,000

Autocar Company, Ardmore, Pa., has entered the four-wheel-drive field with trucks of 3, 4 and 6-ton ratings and listing at \$5,000, \$6,000 and \$7,600 respectively. Use is made of Timken-Wisconsin front-drive axles, and constant-velocity universal joints are used at the wheels. Transfer cases and auxiliary transmissions also are of Timken-Wisconsin make and are located amidships in rubber mountings.

All three models have larger powerplants than similar models with rear-wheel drive, and all are powered by Autocar six-cylinder Blue Streak engines. Engine equipment of the three models is as follows:

Truck Model	Bore and Stroke	Piston Displacement	Horse Power and Speed
4DF	4 1/4 by 4 3/8 in.	404 cu. in.	94 at 2500
4N	4 1/2 by 4 3/8 in.	453 cu. in.	101 at 2500
4S	4 1/2 by 5 1/8 in.	501 cu. in.	124 at 2200

All three models have four-speed transmissions. Rear-axle ratios are 7.35, 7.27 and 7.52 for the three models respectively. Standard wheelbases are 159 in. for the 4DF and 165 in. for the other two models. Special wheelbases can be had if required. All models are fitted with four-wheel hydraulic brakes.

Budd Gets Die, Stamping Order for Soviet Car

An order for automobile dies and stampings that will provide a large volume of work for the tool and machine shops of the Edward G. Budd Manufacturing Co. of Philadelphia for six months has been received from the Amtorg Trading Corporation, according to Edward G. Budd, president of the company. The amount of the contract was not disclosed.

The order covers dies and initial stampings for a complete body and chassis frame for a long-wheelbase, four-door sedan, including fenders, hood, radiator shell, running boards and trunk rack. It also includes dies and initial stampings of disk wheels to be produced by the Budd Wheel Co. in its Detroit plant. The car will be manufactured by the Soviets in the Stalin works in Moscow.

du Pont Co. Develops New Electro-Plating Process

A new electro-plating process, which deposits a bright coating of zinc on steel articles, is announced by E. I. du Pont de Nemours & Co. It is called Du Pont Bright Zinc and will be demonstrated at the National Steel Show, Chicago, Sept. 30 to Oct. 4. The new process, which is said to be the first commercial process giving a bright zinc deposit, is applicable to a wide variety of articles, such as automobile parts and accessories, airplane parts, etc.

Simplex Piston Ring Co. Now Simplex Products Corp.

The Simplex Piston Ring Co. of Cleveland this week announced a change of its name to the Simplex Products Corp. Archie H. Knapp, sales promotion manager, said the name change is to cover new parts being produced. The name change applies also to an associate company which becomes the Simplex Products Sales Corp.

Cummins Used Bohnalite In Economy Run Motor

In the Cummins Diesel engine which powered the Auburn car recently driven across the continent by C. L. Cummins, the weight is brought down by casting the cylinders, crankcase, cylinder head and valve cover of aluminum alloy (Bohnalite). Cast iron pistons were used in this engine.

Air Reduction Co. Builds \$250,000 Chicago Plant

The Air Reduction Company, Inc., of New York is building a new Chicago plant. The cost of building and machinery will be \$250,000. Operation will start in three months on the manufacture of oxygen for the use of the metal trades in conjunction with acetylene gas, principally in welding and cutting.

French Makers Would Halt Production for 12 Months

The French National Automobile Chamber of Commerce has petitioned the Government to take immediate steps to regulate domestic automobile production and to control the market, Lestade Brown, assistant Trade Commissioner at Paris, has reported to the Commerce Department.

Numerous recent failures of automobile manufacturing and selling companies and control measure adopted in other countries have been cited by the French chamber in defense of its stand. An organization of principal French motor vehicle producers, is reported to have announced its members unanimously favoring a 12 month period of non-production beginning next month. It is said these manufacturers are convinced no less drastic remedy can restore the automobile industry in France to a healthy condition.

Hanrahan Joins Algoma

G. M. Hanrahan, for the past 10 years with the Haskelite Mfg. Corp., has accepted a position as assistant sales director of the Technical Division of the Algoma Plywood & Veneer Company, of which James R. Fitzpatrick is director. Mr. Hanrahan will have an office at the Detroit Leland Hotel, Detroit, where he will serve the same territory he has been covering, namely, Ohio, Michigan, New York and Pennsylvania.

N. Y. Dealers Meet Oct. 8

The Empire State Automobile Merchants' Association, Inc., will hold its eleventh annual convention Oct. 8 and 9 at Albany.

CALENDAR OF COMING EVENTS

SHOWS

Machine Tool Show—Cleveland	Sept. 11-21
New York Automobile Show, New York	Nov. 2-9
Baltimore Automobile Show	Nov. 2-9
San Francisco Automobile Show	Nov. 2-9
Detroit Automobile Show	Nov. 9-16
Buffalo Automobile Show	Nov. 9-16
Newark Automobile Show	Nov. 9-16
Cincinnati Automobile Show	Nov. 10-16
Pittsburgh Automobile Show	Nov. 11-16
Philadelphia Automobile Show	Nov. 11-16
Chicago Automobile Show	Nov. 16-23
Minneapolis Automobile Show	Nov. 16-23
Columbus Automobile Show	Nov. 22-28
Cleveland Automobile Show	Nov. 23-30
Montreal Automobile Show	Nov. 23-30
Kansas City Automobile Show	Nov. 30-Dec. 6
Automotive Service Industries Show—Atlantic City	Dec. 9-13

CONVENTIONS AND MEETINGS

S.A.E. National Production Meeting, Cleveland	Sept. 18-19
National Industrial Advertising Association, Pittsburgh	Sept. 18-20
American Transit Assoc., Bus Division, Atlantic City	Sept. 23
National Assoc. Sales Finance Cos.—White Sulphur Springs	Sept. 26-28

American Society for Metals, Annual Meeting—Chicago	Sept. 30-Oct. 4
American Welding Society, Chicago	Sept. 30-Oct. 4
Empire State Automobile Merchants Association, Albany, N. Y.	Oct. 8-9
S.A.E. Transportation Meeting, Chicago	Oct. 10
S.A.E. National Tractor Meeting, Chicago	Oct. 10-11
National Safety Council, Louisville, Ky.	October 14-18
American Trucking Associations, Inc., Chicago	Oct. 14-15
American Gas Association—Atlantic City	Oct. 14-18
Industrial Materials Exhibit, Hotel Astor, New York	Oct. 21-25
Los Angeles	Nov. 2-9
S.A.E. Annual Dinner, New York	Nov. 4
Newark, N. J.	Nov. 9-16
American Petroleum Institute—Los Angeles	Nov. 11-14
Philadelphia	Nov. 11-16
International Acetylene Association, Cleveland	Nov. 12, 13, 15
Baltimore	Nov. 2-9
National Industrial Traffic League—Chicago	Nov. 20-21
Columbus, Ohio	Nov. 22-28

Buick Revamps Engine

by Joseph Geschelin

Detroit Technical Editor,
Automotive Industries

ALTHOUGH Buick Motor Company's engine division as revamped for 1936 production took only a slice of the \$14,500,000 modernization program recently completed by the Flint organization, it em-

bodies some of the most important developments in process and equipment to be found anywhere in the industry.

Witness the new cam ground aluminum alloy piston line, newly tooled up with the latest type of production equipment; including also the last word in anodizing procedure. There, too, is a spacious air-conditioned department in which the pistons are inspected and sorted; and connecting rod and piston assemblies assembled in sets according to schedule.

Some of the many outstanding items of flexible unit-type production machinery installed at various points will be described later. Perhaps one of the most interesting spots is the G.M.R. mass balancer as this is the first machine of its kind to be placed in production. It is of interest to note, too, that it is standard practice in the

Buick plant to use milling cutters tipped with Haynes-Stellite J-metal on all roughing operations on the block and other cast iron parts.

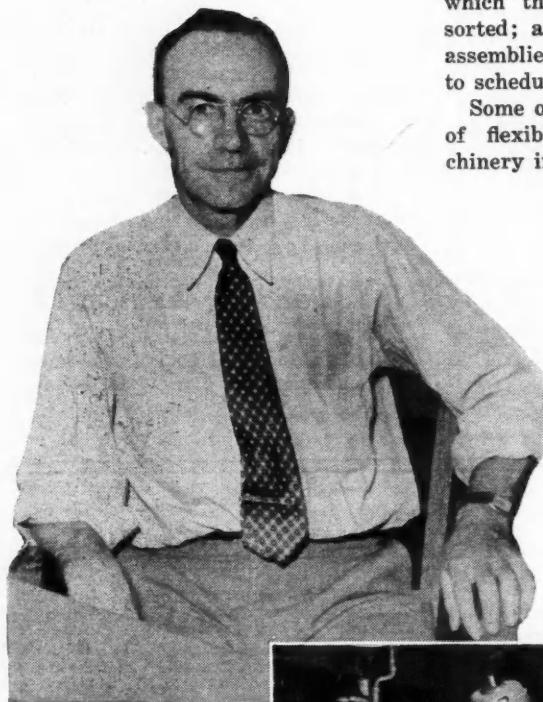
The piston production line has been skillfully conceived and follows the logical routing outlined below. Its most interesting feature is the use of production equipment designed to eliminate multiple handling by combining many operations usually requiring separate set-ups. The routing as well as some of the high spots of the line follow:

1. Bore face, center open end, center closed end—performed automatically on an 8 x 15 in. Fay automatic lathe. This machine handles both rough and finish operations in facing and boring, in one setting, with separate sets of tools.

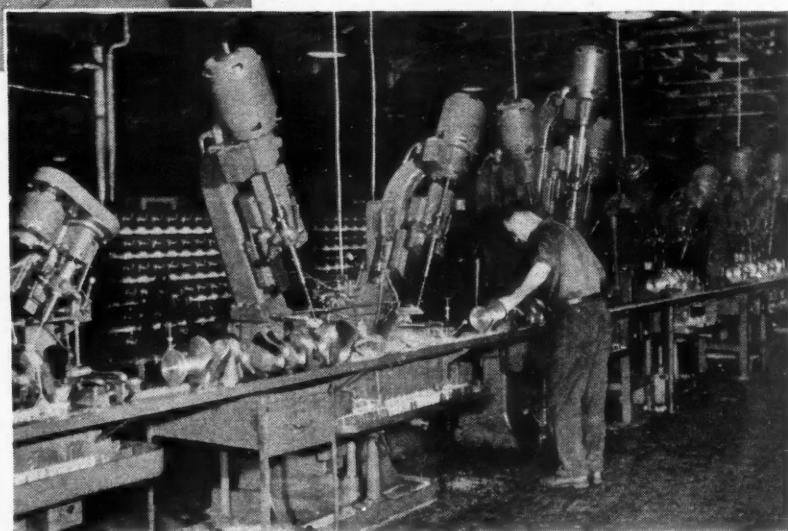
2. Recenter chamfer at open end on 21 in. Cincinnati drill press.

3. Cam turn O.D., face top, form ring lands, grooves, and 6 deg. chamfer on 12 x 21 in. Fay automatic lathe. Three of these machines are required to handle the desired volume. This battery also handles both rough and finish operations in a single setting with separate sets of tool magazines. Cemented carbide tools are used.

4. Drill piston pin hole on Kingsbury double-end machine. Two four-fluted core drills are used, tipped with cemented carbide.



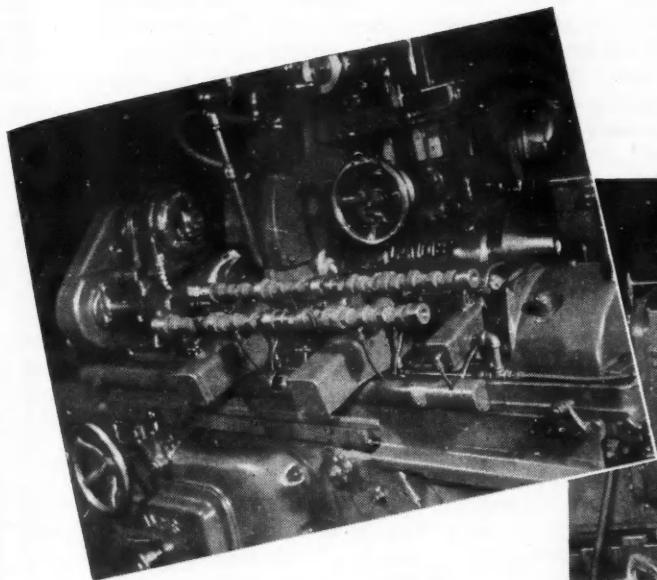
J. G. Hammond, superintendent of Buick engine plant



View of battery of six Leland-Gifford drilling machines with special hydraulic feed mechanism for drilling seventeen oil holes in crankshaft

Division for 1936 Output

Features include new aluminum piston line and anodizing equipment, and air-conditioned room for final assembly and inspection of pistons and rods



(Left)—Camshaft bearings are rough-ground on this Landis grinder, equipped with the Landis air-sizing attachment

(Upper right)—View in air-conditioned inspection department where pistons are sorted and rod and piston assemblies made up to schedule. This is a close-up at the piston inspection station

(Lower right)—Close-up of work fixture in six-head Foote-Burt machine drilling various holes in flywheel housing. It also bores the large diameter starter hole

5. Chamfer piston pin hole on Cincinnati electric speed lathe.

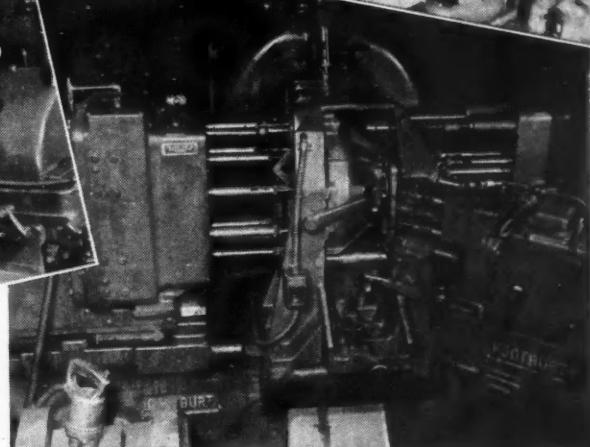
6. Size-ream pin hole using special step reamer.

7. Drill oil holes in oil seal ring grooves. The machine used here is a six-spindle Kingsbury having three fixtures, each incorporating 10-position indexing.

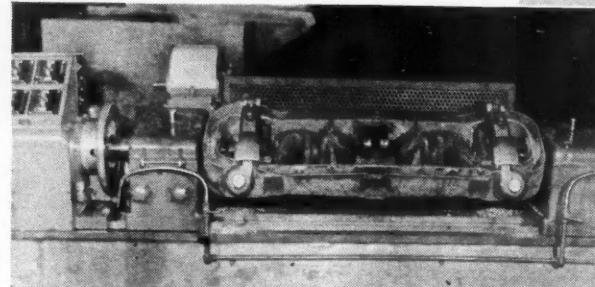
8. Drill oil holes in pin bosses (two $5/32$ in. HSS drills) on an Avey drill press fitted with a two-spindle head.

9. Drill saw slot holes and cut saw slots on inside of piston on a novel multiple head Kingsbury, equipped with six work-holding fixtures of the rotatable type. The entire cycle is fully automatic. In operation the operator loads a piston in the fixture, slips a false pin through the piston pin hole, one end of this pin being knurled; then clamps the work through a swinging yoke which contacts the top and side of this false piston pin simultaneously so that it automatically squares the work up and clamps at the same time; he then trips the air control valve. The dial indexes into the first working position at which time (2) holes are drilled for the horizontal slot, also (2) holes are drilled by a second drilling unit equipped with a 2-spindle auxiliary head for the nearly vertical slot. The dial is then indexed again and on this particular set-up Station No. 2 is not used; on an additional index coming into Station No. 3 the vertical angular saw slot is milled. (Note that this operation is not performed until the part has traveled around the machine the second time.) Station No. 4 mills the horizontal saw slot on the first trip around the machine. At Station No. 5, the work is unclamped, rotated on its own axis 180 deg., reclamped and indexed around the machine but only worked upon in Station No. 1 and No. 3 where the second pair of holes on the 140 deg. angle are drilled, and then in Station No. 3 the second horizontal slot is put in.

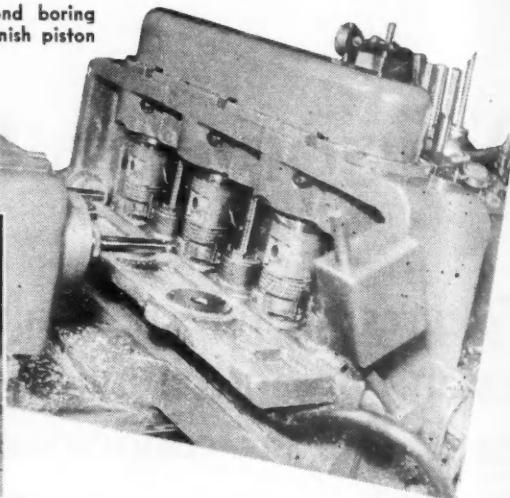
10. Burr oil return holes and saw slots on inside. This is a wire brush



G.M.R. mass balancing machine. View shows close-up of cradle in which crank-shaft forging is mounted. The lighted chart indicating magnitude and location of unbalance is just at the upper left hand edge of the cradle. Motors are controlled from the push button station at the extreme left



Close-up of Ex-Cell-O diamond boring machine used to rough and finish piston pin holes.



operation on a Cincinnati electric speed lathe.

11. Burr outside of oil return holes on similar machine using special ground bastard file.

12. Burr ring grooves on similar machine using a 10 in. flat smooth mill file.

13. Recenter open end on 21 in. Cincinnati drill press.

14. Rough grind piston contour on 10 x 36 Norton plain grinder fitted with a cam grinding attachment.

15. Final recenter open end on Cincinnati drill press.

16. Finish grind piston contour on 10 x 36 Norton plain grinder with cam grinding attachment.

17. Spot face excess stock from center on Avey drill press.

18. Machine for standard weight on a Morris balancing machine. Here is a very interesting operation in which the weight bosses inside the piston are milled down so as to hold the standard weight within limits of plus or minus 1½ grams. In operation, a standard weight ring is slipped over the piston, the piston fitted on a hinged arm which drops down to the milling position. The depth to which the open end moves down depends upon piston weight and is proportional to the amount of stock which must be removed. The milling cutter has inserted blades tipped with cemented carbide. The operation is entirely automatic since the amount of stock removal is determined by automatic weighing.

19. Anodize. This will be described later.

20. Chamfer piston pin hole, both sides from outside.

21. Diamond bore piston pin holes on Ex-Cell-O diamond boring machine handling three pistons at a time. Two machines are required, each with six heads; one row for roughing, the other for finishing. The pistons are mounted

in a center fixture between the two rows of heads. For the first operation, the fixture moves over to engage the roughing heads which drive boring bars fitted with two cemented carbide tool tips. After this operation is completed, the fixture moves to the opposite side to engage the diamond boring bars which take the finishing cuts. As the diamond completes the stroke, a brake is applied to stop rotation and prevent formation of a spiral scratch in the polished bore. Bores are held to a tolerance of 0.0001 in. for size and alignment.

22. Final inspection to be described later.

The anodizing procedure developed here is said to be the last word in the art. The cycle is fully automatic through the use of a Meaker automatic return conveyor which synchronizes the horizontal movement of the work with the up-and-down cycle through the tanks. Rubber covered aluminum racks are used, handling a set of ten pistons at a time. Total time from loading to the final operation is 60 minutes.

The sequence of events is as follows:

1. Dip in alkaline cleaning solution.
2. Cold water rinse.

3. Anodizing bath, checked daily by the plant research staff, consists of a solution of sulphuric acid and oxalic acid in definite proportions. The temperature of the bath is held at 85 deg. Fahr. by thermostatic control.

4. Cold bath.

5. Hot bath (final step).

6. After the coated pistons are removed, the racks dip into a strip tank containing sulphuric acid which removes the oxide coating from the rack points to assure good electrical contact.

In addition to the daily control of the anodizing bath, plant research also checks the quality of the piston coating by subjecting random samples twice

daily to the Abrasimeter test. This is a special sand blast equipment which sprays aluminum oxide on the coating at a definite rate of discharge, the criterion of quality being the weight in grams of abrasive required to break through the anodized coating. In addition, the coating is checked for depth by measuring microphotographs at several sections.

It is of interest to note that the anodizing treatment is made prior to the diamond boring of the piston pin hole. This is a good commentary on the performance of the diamond cutters of the Ex-Cell-O boring machines which are required to cut through the coating for the roughing operation. Some idea of the hardness of the coating of aluminum oxide may be gained from the fact that on the Mohs scale of hardness the diamond is 10 whereas the coating is 9.7.

Because of the close tolerances to which the pistons and connecting rods are held, final inspection and assembly into sets are handled in an air-conditioned room where the temperature is maintained at 70 deg. Fahr. Piston diameters are checked by means of new Sheffield electric gages of the visual type; graded for size in five steps, 0.0003 in. apart, and marked with a number indicating the grade.

One of the most interesting features in this department is the telautograph instrument used to control the assembly of pistons and connecting rods in sets. The scheduling station is directly connected with the final inspection station on the cylinder block line where each bore is accurately measured by gages indicating the bore sizes according to the same grade number as is used in marking pistons. As the cylinder bores are measured, the record comes through giving the block number as well as the grade number of each bore.

With this information, the proper piston grades for the individual block are selected from the storage racks, assembled on a set of rods, and hooked on the overhead monorail to the engine assembly line.

Many new items of production equipment are found at every turn in the cylinder block line. Here for example is a battery of two two-way horizontal hydraulic feed Greenlee crank and cam boring machines of entirely new design. The semi-finish-bore machine has two motor driven cutter bars tipped with cemented carbide. Handling of the blocks in these machines has been vastly simplified. Blocks are loaded by pushing directly from the table into the fixture, the fixture being hydraulically lifted to the cutting position, then lowered to table level again, thus relieving the operator of the usual handling operations. This machine also taps a $\frac{3}{8}$ in. pipe thread at each end of the oil gallery hole.

Another interesting Greenlee machine is a three-station five-head unit which automatically drills the oil holes and galleries in the cam and main bearings in the crankcase. It drills 15 holes, taps 9 holes, moving the blocks by automatic transfer.

Much improvement has been made in the production of crankshafts. For

instance, several new LeBlond lathes have been installed to permit rough and finish turning of pins and bearings in the lathes, eliminating the usual rough grinding. Now the only grinding operation is finish grind.

Then there is the battery of six Leland-Gifford drilling machines for drilling the oil holes in the crankshaft. The machines are fitted with the Leland-Gifford hydraulic feed mechanism which makes possible the drilling of holes in the tough alloy steel forging automatically without drill breakage. By subdividing the drilling among the six machines, they drill 17 holes per shaft at the rate of 25 per hour.

A rather startling development is the application of the first G.M.R. mass balancer for balancing and centering crankshafts in the rough. This is a horizontal machine, mounting the shaft in a cradle supported on slip-ring bearings at each end, each bearing being floated on four plungers, 90 deg. apart. Two upper plungers at each end are spring loaded; the other two at each end are movable by means of a motor-driven adjustment—one motor per plunger.

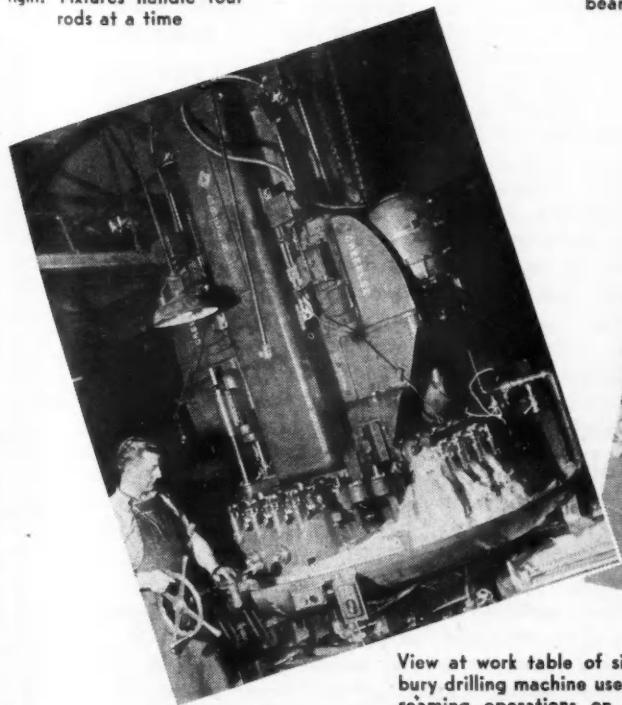
The shaft is mounted in the cradle and started in rotation at a constant speed. The degree of unbalance in all planes is noted on the characteristic

G.M.R. chart, modified so that the area of unbalance is divided into four squares, each one controlled by one of the plunger-drive motors, and numbered according to the motor location. Now the operator presses a button corresponding to the location of unbalance and keeps the motor running until the unbalance disappears—motors are geared to the plunger screw with a ratio of 900 to 1 for sensitive adjustment. This procedure is continued until the shaft is in balance within the limit lines on the chart. Then another button starts the two end motors which bring in the center cutters.

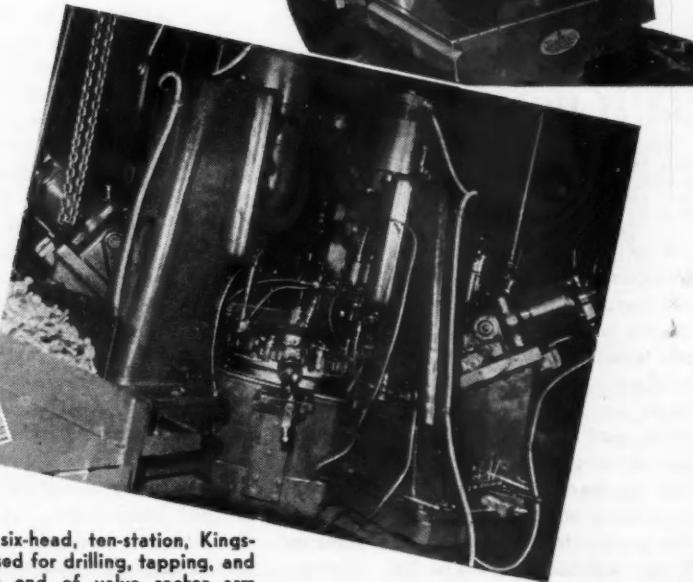
Experimental production has shown that the mass balancing operation eliminates 70 per cent of the usual correction for final machining, saving both time and waste.

Two six-way Foote-Burt drilling machines are used in the production of flywheel housings; one for drilling, the other for tapping. The first machine drills 37 holes, including the boring of

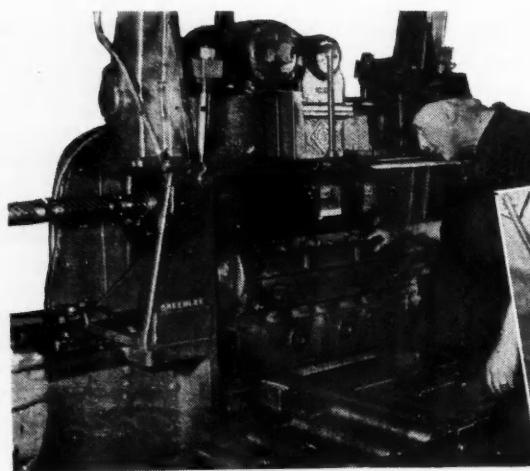
Huge Greenlee machine toolled up for drilling and reaming connecting rod big and small ends simultaneously at separate stations; also slitting the big end at the milling station at the right. Fixtures handle four rods at a time



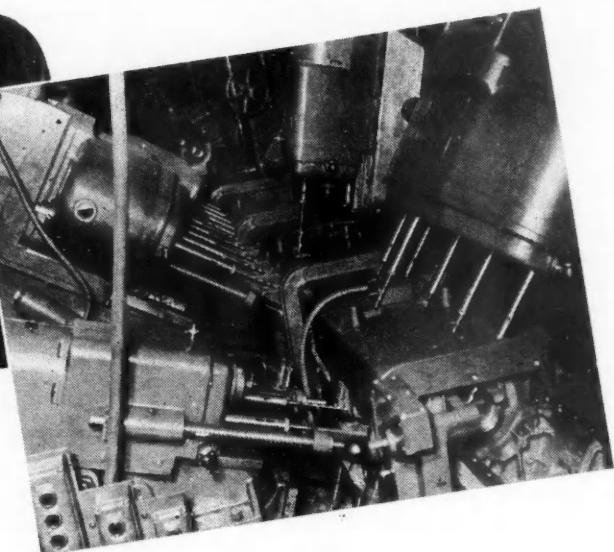
View at work table of six-head, ten-station, Kingsbury drilling machine used for drilling, tapping, and reaming operations on end of valve rocker arm



View of new Sheffield electric gage used for checking piston diameters. The white scale is divided into sections 0.0003 in. apart about the normal diameter for sorting pistons according to exact size. The reading on the scale is indicated by a beam of light coming from the top of the instrument



Two-way Greenlee hydraulic machine for semi-finish boring of cam and crank bearings. Heads are on opposite sides—one for the cam, the other for crank bearings. Fixture clamps, lifts, and lowers hydraulically



the large diameter starter hole; the other taps 28 holes. You don't see automatically synchronized six-head machines very often in a day's journey.

One of the biggest jobs cut out for any machine is the finishing of the rocker arm as it's done on a ten-station Kingsbury. The fixtures are so arranged as to handle left-hand, right-hand and straight arms and the set-up is so flexible that the machine can be changed from one type to another in a matter of minutes. This machine is an excellent example of the indexing type where the work is loaded once and the various steps handled in the one setting. The tapping unit of the machine is equipped with a cam having the same lead as the pitch of the work-

thread, thus permitting the production of an extremely accurate thread.

This machine is arranged to perform the following sequence of operations:

Station No. 1: Spot drill tapped hole to obtain the desired countersink after this hole is drilled through.

Station No. 2: Drill the 3/16-in. angular hole 1/3 depth; this hole leads from the tapped hole into the large hole.

Stations Nos. 3, 4 and 5: Using a No. 30 drilling unit equipped with a three-spindle auxiliary head drill the tapped hole 1/2 depth, finish drilling the tapped hole, and spot face the tapped hole.

Station No. 6: Drill 3/16-in. angular hole 2/3 depth.

Close-up of three-station, five-head Greenlee drilling fifteen oil holes and tapping nine holes in crankcase

Station No. 7: Ream tapped hole from the top and countersink this hole from the bottom, using underneath burring spindle unit timed for operation after the reamer has withdrawn from the hole.

Station No. 8: Drill 3/16-in. hole full depth.

Station No. 9: Tap $\frac{3}{16}$ -in.—24.

Station No. 10: Load and unload.

The foregoing, obviously, is but a sketchy review of some of the high spots in the Buick engine division. It is a good commentary on the skill with which this plant has been lined up and the judgment used in the selection of equipment compatible with Buick quality and volume requirements.

Automotive Book List of 1934

Auto-Bucherschau 1934 (Automotive Book List of 1934), published by Klasing & Co. Berlin W-9, Germany, at the instance of the German Automobile Manufacturers Association.

This is a listing of all of the publications which appeared in 1934 in the German language on the general subject of motor vehicles, including certain related fields such as fuels, road building, traffic problems, touring maps, etc. No less than 814 items are listed, and it is shown by a diagram that activity in the motor-publishing field increased in substantially direct proportion to the increase in automobile production following the removal of the annual tax. The list includes

technical books, technical and scientific pamphlets (research reports, theses, etc.), popular works on sport, company financial reports, touring literature, trade publications, legal publications, etc.

Symposium on Paint and Paint Materials

A SYMPOSIUM on paint and paint materials was held by the American Society for Testing Materials at a meeting in Philadelphia in March last. The fifteen technical papers contributed to that symposium, together with the discussions thereon, have now been issued in book form by the Society.

After a "Look into the Future" there is a paper dealing with the preparation, use and abuse of specifications, followed by discussion of protective and decorative coatings for railway passenger car equipment. Paint, varnish and lacquer testing are described and extensive papers follow on drying oils, zinc, lead and titanium pigments, mineral earth colors and synthetic iron oxides and chemical colors. Natural and synthetic resins; lacquer solvents and volatile thinners; and turpentine and petroleum distillates as thinners for varnish and paint, are covered in the remaining three papers.

The book is published in paper covers at \$1.25 and in cloth at \$1.50. Copies may be had from A.S.T.M. headquarters at 260 So. Broad Street, Philadelphia.

JUST AMONG OURSELVES

No Used Car Problem In England?

WE were amazed to read recently that a British dealer visiting here had asserted that there was no used car problem in England and that the public accepts proposed allowances on used cars more or less without argument. Unfortunately, according to our information, the dealer in question must have been gilding the lily, because from all we can find out there is a used car problem, and English buyers do chisel for higher used car allowances. The problems facing British dealers, it is true, may not be as acute as those confronting American automobile retailers, but if they haven't a used car problem why all the argument that is currently agitating the trade over there about the price protection scheme involving about the same principles as the dealer code?

* * *

Blind Spot Diagrams

ONE of the things we don't like about the recent trend of automobile styles is that we seem to be steadily curtailing the driver's vision. Perhaps it isn't important for him to see the areas he no longer can see but for ourselves, the more we can see, the safer we feel.

In this connection, it might be worth while to develop blind spot diagrams of current models and of the 1936 models which are soon to be announced. These could be made simply by placing the car on a level area and marking the areas which are invisible to the driver as he sits behind the wheel. If such diagrams did nothing more, they would at

least show the effects of the 1936 body styling on vision. With this information, it is conceivable that with a little ingenuity the same eye-appeal might be obtained in some cases with an actual improvement in vision.

In any case, such diagrams would emphasize vision as an element in the styling problem. We are inclined to think that it has not generally been recognized as such. In fact, we suspect that the steady curtailment in vision has been caused by concentration on the styling problem with the vital question of vision getting relatively little attention.

* * *

NLRB Must Make Major Decisions Soon

CHARGES filed with the National Labor Relations Board by the A. F. of L. involving Bendix Products and the Chevrolet and Fisher plants in Atlanta put the Board on the spot. It must make its decision on what is perhaps the major issue raised by the Wagner Act at an early date.

This issue is, of course, what is interstate commerce and what directly affects it sufficiently to become a proper subject of Federal control. The Federation presumably will rehearse the old argument that supplies moving into these plants, and products moving out, enter into interstate commerce and that hence an interruption occasioned by a labor dispute would directly affect interstate commerce.

As we see it, the Supreme Court specifically rejected this line of legal reasoning in the NRA decision, but whether the Board will take this view remains to be seen.

None of the three automotive employers so far involved have indicated what course they will pursue in the event they are called before the Board on these charges. There are at least two possible courses they might pursue. One is to challenge the jurisdiction of the Board and refuse to participate in its proceedings, and the other would be to defend themselves at the hearings, with future action dependent on the Board's decision. The first course of action obviously would lead to an early court test, while the latter quite possibly might have the same result.

* * *

Retreading and Rubber Prices

EFFORTS to maintain prices at artificially high levels are always confronted with the possibility that the public will turn to substitutes, or, if none are available, there will always be those who will apply themselves to the problem of providing a substitute. This may be happening in the tire field, where the Department of Commerce finds there recently has been a rapid growth in retreading. In the Department's opinion, one of the factors responsible for this expansion may be the International Rubber Regulation Agreement which went into effect a year ago last June and that this development may exercise an influence on the rubber control scheme, since retreading increases the mileage per pound of rubber consumed and thus operates to reduce the total consumption of this raw material.

The Department indicates that retreads may total 5,000,000 casings this year and points out this represents a considerable decentralization of tire production, since retreading plants are pretty well scattered over the country and as their output expands, production of new casings in the tire manufacturing centers decreases in approximately the same proportion.

—D. B.

Hercules Gasoline-Engine Starters for Diesels

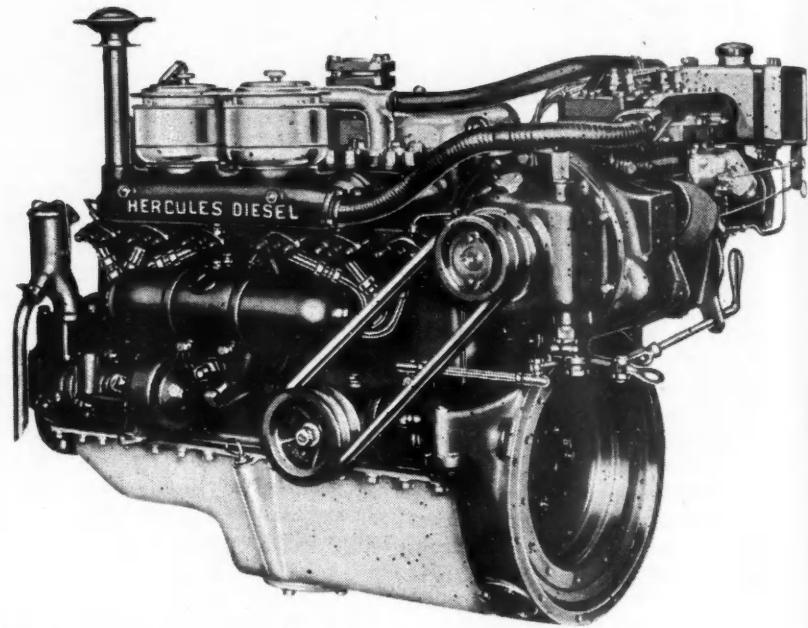
FOR certain applications, a gasoline engine has advantages as a starter for Diesel engines. Hercules Motors Corporation, Canton, Ohio, has developed and now offers such a starting unit on both the DHXB six-cylinder 5 by 6-in. and the DRXB six-cylinder 4½ by 5½-in. Diesel engines and power units.

The gasoline engine used is the Hercules Model ZX, a four-cylinder 2½ by 3-in. unit. It is equipped with magneto, air cleaner, governor, and small gasoline tank. The controls, including the switch, choke, starting crank and throttle, are all located at the front, which is on the right side of the Diesel (looking from the flywheel end), where they are easily accessible for starting and operating.

This gasoline engine cranks the Diesel engine through a pinion meshing with the usual flywheel ring gear, driving the pinion by V belts. A clutch disengages the gasoline engine from the V belt drive to facilitate starting it. This clutch is interconnected with the starter pinion. After the gasoline engine is started, either by a starting motor or by hand cranking, the operating lever is moved to engage the clutch. The first movement of the lever meshes the pinion with the ring gear and further motion engages the clutch and cranks the Diesel engine. When the Diesel has started, the cranking pinion is automatically "kicked" out of mesh by the reverse torque.

A four-cylinder engine has a more nearly uniform torque than one with a smaller number of cylinders, which is said to insure positive engagement of the starting pinion until the Diesel has started. The maximum governed speed of the gasoline starting unit is 3200 r.p.m. This speed provides the necessary cranking speed.

In extremely cold weather the gasoline engine can be operated indefinitely, and will then warm up the water, oil



Hercules gasoline starter engine
on a diesel engine

and intake manifold of the Diesel. The gasoline engine is equipped with a water pump, so that the water is circulated through the cylinder block of the Diesel engine to warm the cylinders, heads and lubricating oil in cold weather. As a further aid to starting in severe cold weather the exhaust from the gasoline engine is piped through a

special manifold on the Diesel engine, thus heating the intake manifold.

This starting arrangement is not intended to supplant electrical starters for Diesel engines; it was developed for application particularly in foreign markets, and wherever the proper maintenance of batteries is a difficult matter.

Fuel and Oil Consumption of Aircraft

AN average airplane flies 3.6 miles on a gallon of gasoline and about 100 miles on a gallon of lubricating oil. The consumption of fuel is about 27 times the consumption of lubricating oil. These figures result from an analy-

sis of a statement recently published by the Department of Commerce, bearing on the miles flown and the fuel and oil consumed by different types of aircraft during 1934. The Department of Commerce figures follow:

Civil and commercial aircraft:

Scheduled air-line services
Miscellaneous flying

Total
Government aircraft¹

Grand total

¹ All gasoline and oil consumed by the Army Air Corps; National Guard; Bureau of Aeronautics—Navy Department (including the Marine Corps); the U. S. Coast Guard and the Bureau of Air Commerce, Department of Commerce, is included under this heading.

	Gasoline Gallons	Oil Gallons	Miles flown
Scheduled air-line services	25,136,274	838,756	48,786,551
Miscellaneous flying	9,630,869	348,985	75,602,152
Total	34,767,143	1,187,741	124,388,703
Government aircraft ¹	23,647,113	970,547	85,926,787
Grand total	58,414,256	2,158,288	210,309,490

Oil Consumption Found to Increase with Detonation

Tests also indicate combustion chemistry has important effect on cylinder wear

THAT the consumption of lubricating oil increases rapidly when an engine begins to detonate was one of the most interesting findings of an investigation carried out at Pennsylvania State College and which is dealt with in *Engineering Experiment Station Bulletin* No. 44, "Performance Tests of Lubricating Oils in Automobile Engines," by H. A. Everett and F. C. Stewart. The investigation was carried through with financial support from the Pennsylvania Grade Crude Oil Association.

Many physical and some chemical tests are now being applied to lubricating oils, but no one of these tests, nor any small group thereof, yields results which would be accepted as indicating the general merit of an oil for any particular purpose. What the average user wants to know is what such test results signify from the standpoint of performance in actual service, and it was with the object of evolving a system of comprehensive tests that would permit of giving the oil user the information he wants that the investigation reported upon was undertaken.

There is, of course, a very large array of machines which are being lubricated with mineral oil, but in view of the fact that more oil is used for the lubrication of automobile engines than for any other class of machinery, it was decided to run all tests on such engines. Tests, of course, could be made either in the laboratory or on the road, but the balance of advantages was found to be in favor of laboratory tests, and these were decided upon.

Four Dodge six-cylinder passenger car engines were bought, installed in the laboratory, and connected to hydraulic dynamometers. One of the factors affecting oil consumption is loss through the breather (or filler pipe), and to permit of providing means to make this the same in the tests as in

regular road service, road tests were made to determine the air velocity past the mouth of the breather at various car speeds. It was found that this velocity varied substantially in linear relationship to the car speed, from 4 m.p.h. at a car speed of 30 m.p.h. to 32 m.p.h. at a car speed of 70 m.p.h. A blower was installed in front of each engine and regulated to give an air speed past the crankcase and the breather equal to that obtaining in service on level roads when the car consumes the same horsepower as that absorbed by the dynamometer.

It was considered, that from the standpoint of the owner, that lubricating oil is best which is consumed in the least quantity and which results in the least wear of the engine. Oil consumption could be measured directly, but the amount of engine wear had to be determined indirectly. For the determination of wear on cylinders and piston rings, the colorimetric method of determining the iron content of crankcase oil, described in *Automotive Industries* of April 16, 1935, was evolved. The results of this method checked well with direct measurements of wear, and that method, therefore, was used throughout the tests. To accurately determine the amount of oil used during a run was found to be not as simple a problem as had been expected. The method finally used consisted in fastening a cylindrical container on the floor below the crankcase of each engine and using it as an oil sump, the suction line of the pump being extended to near the bottom of this sump and the oil collecting at the bottom of the engine crankcase draining into it. The stationary container was provided with a glass gage connected to it at the bottom by means of a rubber tube, so that from the diameter of the container and the drop of the oil level in it, as indicated by the gage, the loss (or consumption) of

oil during any run could be readily determined. Readings of the level in the gage glass were made by means of a hook and micrometer vernier.

Oil consumption was actually determined by three methods, as follows: (1) Weighing the oil in the sump before and after each run; (2) measuring the level in the sump before and after the run, and (3) taking readings at 10-min. intervals of the level in the sump and plotting these readings for the length of the run.

As the primary object was to compare different oils, it was necessary to have all other factors in runs with the different oils as nearly as possible alike. To this end, temperatures were taken (by means of thermocouples) of the inlet water, outlet water, intake mixture, exhaust gas, oil in sump, oil vapor in crankcase, and oil in the pump exit. The blowby was measured by a gasometer, and a correction was made for air leakage into the crankcase, which was measured separately with the engine stationary.

Seven different oils were tested, one being a commercial oil which was run as obtained, while the others were blends of bright stock and neutrals from various sources and were so matched that all had the same viscosity (217 secs. Saybolt) at 130 deg. F. The reference oil, No. 1, was a blend of Pennsylvania neutral with Pennsylvania bright stock. No. 2 was from another field than Pennsylvania. No. 3 was of similar origin as No. 1, but the neutral used was of somewhat lower viscosity. No. 4 was similar except that the neutral was of somewhat higher viscosity than that in the reference oil. No. 5 was the commercial oil already referred to. No. 6 was a blend of Pennsylvania oils similar to No. 4, and No. 8 was a blend of neutral with bright stock, both of Pennsylvania origin, these last two test oils being obtained by solvent refining

processes. All of the physical properties of these test oils were determined, and they are given in the report in tabular form.

The principal investigations related to oil consumption and cylinder wear with the different oils under standard operating conditions, but in addition a number of collateral investigations were found to be desirable, these including an investigation of the "oiliness" characteristics of the test oils, an investigation to determine whether the iron worn from the engine cylinders appeared mainly in the lubricating oil or was partly carried off by the exhaust gases, an investigation of the possible effect of different fuels, and the possibility of investigating the character of the contaminants of the used oil by microscopic or photomicroscopic methods.

There was as yet no scale in which to express "oiliness," and one was therefore evolved, which is known as the Penn State oiliness number. Tests for "oiliness" were carried out on a modified Timken bearing-friction or lubricant-testing machine. In the original Timken machine a rectangular block is pressed upward against a journal, the pressure on the block being successively increased until the film of lubricant breaks down. Provisions are made for measuring the frictional force between journal and block. This machine was modified by replacing the block with a fitted bearing of known projected area, eliminating the means for measuring the frictional force, and inserting a thermocouple in the bearing to determine the temperature as close to the bearing surface as possible. The temperature of the oil entering the bearing was also measured and was held constant at 130 deg. It is obvious that the temperature difference between entering oil and bearing surface is a measure of the internal friction of the oil. Temperature rises were plotted against bearing loads, and the graphs thus obtained are thought to give reliable information concerning the frictional qualities of the oils. The tests were carried to the limit of the machine, which with the small bearing used was found to be 24,000 lb. per sq. in. The Penn State oiliness number of any oil is the ratio of the temperature rise (difference between temperature of entering oil and bearing-surface temperature) with the test oil to the temperature rise with the reference oil at a load of 24,000 lb. per sq. in. It was found that this number is extremely sensitive to changes in the conditions of bearing and journal surfaces and can be duplicated only when both are very smooth, accurately aligned and fitted, and free from dust and grit.

To determine whether any of the iron particles worn off the cylinder walls and rings escaped with the exhaust, the latter was discharged into a large copper chamber into which water was sprayed, and the exhaust thus scrubbed. The water was then analyzed for iron contamination, and distinct indications of iron were found, but the results are not regarded as conclusive and more comprehensive tests are under way.

Another collateral investigation was that of the effect of the fuel used on engine wear, which was made on a six-cylinder Chevrolet engine. It is stated by the authors that both of these investigations (i.e., effect of lubricating oil on cylinder wear and effect of fuel used on cylinder wear) point strongly to the possibility that the chemical aspect of the active combustion period plays an important and possibly a predominant part in the performance of lubricating oils and must receive consideration, in addition to the physical properties customarily dealt with in investigations of cylinder wear.

Reference is made in the report also to a method of microscopical examination of used crankcase oil, on which work is being done in the Department of Chemistry by Dr. Mary L. Willard. Three photomicrographs are shown of iron oxide, carbon, and abraded iron respectively in the reference oil, at magnifications of 1000 diameters, and it is stated that it is possible to make the equivalent of a "blood count" on these graphs. A preliminary examination of some of the samples for which iron analyses had been made showed more "specs" in the samples having the higher iron content. Indications are that it will be possible to determine the contents of various contaminants in the oil by this method, but much more work is required to fully develop it.

Data of results obtained in the tests are incorporated in the report in the form of charts. Each chart covers one run with all of the four engines and shows the change of all of the various oil properties determined with time, the specific property being plotted as ordi-

(Turn to page 374, please)

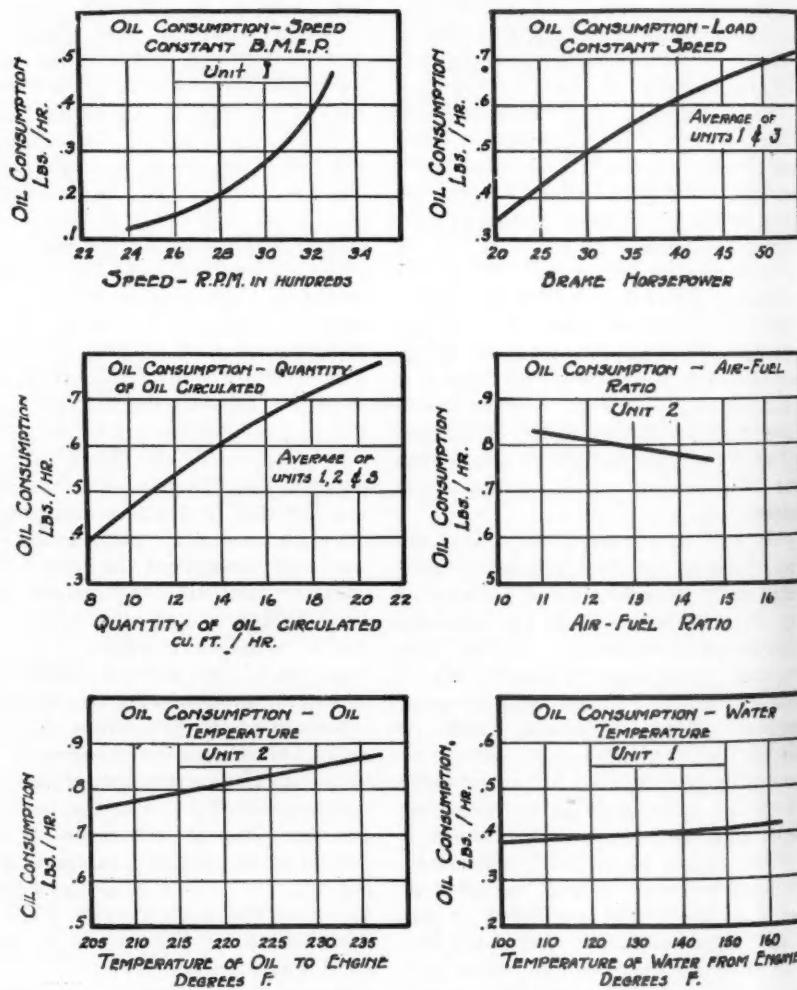


Fig. 1.—The Effect of Several Variables on Oil Consumption.

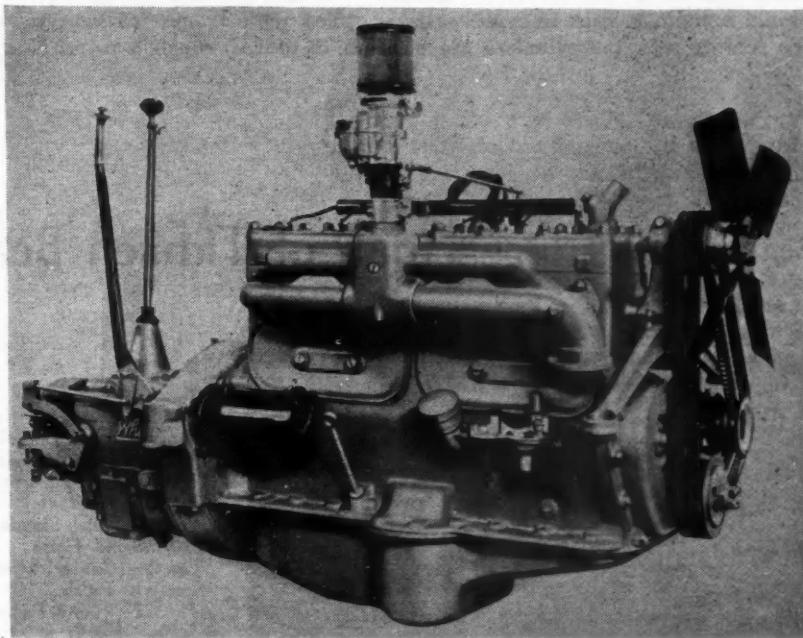
Streamlined White—

New 1½ to 2-ton
chassis priced at \$1,240

WHITE MOTOR CO., Cleveland, Ohio, has announced a new model, the 704, which is claimed to be the first completely streamlined truck. It was styled for the company by Count Alexis de Sakhnoffsky, the well-known industrial stylist. Radiator shell, cowl, hood and rear are said to be perfectly blended, the headlamps are fully streamlined, and the fenders suggest a creased center line. The ornamental motif of the truck is composed of parallel lines, noticeable on the radiator louvers (which are horizontal), the side splashes, and the running boards. Ruggedness of design is emphasized by oversize hub caps, instrument dials and heavy-valanced fenders.

The 704 is a 1½ to 2-ton truck and sells for \$1,240 at the factory for the chassis. It can be obtained with standard bodies if desired, and tractor-trailer units also are available.

The new truck is equipped with a six-cylinder engine of 270 cu. in. displacement, which is rated at 80 hp. at



The six-cylinder, 270-cu. in. engine with Stellite valve seats, which powers the new series of White streamlined trucks.



The streamlined White panel truck Model 703, and left to right, Frank G. Alborn, chief engineer of The White Motor Company, designer of the truck; Robert F. Black, White president, and Count Alexis de Sakhnoffsky, internationally-famous industrial stylist who styled the truck. Four-wheel booster operated hydraulic brakes and the first automatically air-conditioned cab ever placed on a truck are features of the new offering.

3000 r.p.m. Its maximum torque is 185 lb.-ft. The engine has a compression ratio of 5.5 and its crankshaft, connecting rods and crankcase are identical with the corresponding parts of the 9A engine, which has 303 cu. in. displacement. Cylinders and crankcase are cast in a single block. The White company's offer to exchange engines when an overhaul becomes necessary applies to this model.

Lubrication is by force feed to main, connecting-rod, camshaft and piston-pin bearings. Oil is delivered directly to the front-end gears, and a metered quantity is fed to the pistons and rings, so every part is positively lubricated.

In a general way the engine is similar to the 702. One difference between the two is that the water pump, instead of being mounted at the front of the cylinder block, is mounted at the side.

Special efforts have been made to assure accessibility to all of the engine

accessories, most of which are located on the right side. The engine is mounted in rubber and has a forged I-beam support at the front.

The clutch and transmission are generally similar to the corresponding parts on the 702. In addition to the standard transmission, two five-speed transmissions will be available, one with direct drive in fifth and the other with direct drive in fourth.

Axles and steering gear are similar to the corresponding units of the 702. Brake boosters are fitted, the same as on the previous model, and a number of improvements have been made in them. Formerly the booster cylinders would sometimes stick in cold weather. To remedy this, the cylinders are now

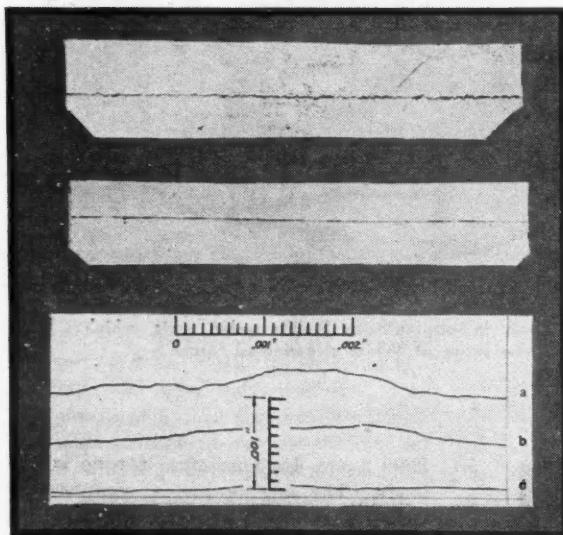
so located that they are not in the direct path of water, snow and slush from the street, but under the engine hood; provisions are made to assure that all air entering the booster for its operation is free of dirt and moisture, by passing it through an air cleaner. The control valve is so arranged that it operates positively in both directions and cannot stick. Boots covering the operating mechanism are sealed at both ends. Another improvement consists in the use of clamp bolts for holding the booster together, which permits of its ready removal for cleaning and overhaul.

Long-wheelbase models will be provided with frames of heavier section, so as to limit the deflections. All frames

are heat treated and have cross-members of full depth and heavily gusseted.

The most important changes have been made in the cab, and the new cabs are said to be not only modern in appearance but to offer advantages from the standpoints of comfort and ease of operation. An additional 2½ in. of depth is provided which, together with the steering gear adjustable to three positions, assures driver comfort. The Nichols-Lintern air-conditioning ventilating system is used, which automatically exhausts the air from the cab when the truck is in motion. There is a large cowl ventilator and the cab, roof, floor boards and dash are heavily insulated. Dunlop rubber-seat cushions and seat backs are provided.

Surface Finish of Timken Bearings Improved



Profilograms of Timken Bearing Finishes. Magnification, 250 Vertical, 15 Horizontal
 Fig. 1—(Top) Standard Grind Finish
 Fig. 2—(Center) Mirror Finish
 Fig. 3—(Lower) Surfaces shown in true proportions, showing blunting of irregularities. Magnification 500 X (a) Rough hone; (b) One feed mark of diamond bore; (c) Finish hone reproduced half actual size

WHAT is claimed to be a major improvement in surface finish—termed "mirror finish" by the company—is being applied to Timken bearings as rapidly as the special equipment required can be built and installed. Even the standard finish on Timken bearings is smooth to the eye- and finger-nail test, but the new "mirror finish" is said to be very much smoother.

The accompanying photographs show both standard and "mirror finish" surfaces magnified 500 times in the vertical plane. Even though the measurements were made with equipment capable of measuring in terms of a millionth of an inch, it was impossible to find a flaw in a "mirror finished" bearing surface.

This improvement in surface finish is an outcome of experimental work which started with the development of a method of measuring surface finish.

In the Aug. 19, 1933, issue of *Automotive Industries* there appeared an ar-

title by Dr. E. J. Abbott, research physicist at the University of Michigan, and F. A. Firestone, associate professor at the same university, entitled "New Profilograph Measures Roughness of Finely Finished and Ground Surfaces," which outlined development work done in connection with Timken research at the University of Michigan and described the instrument developed by Dr. Abbott, known as the "Profilograph."

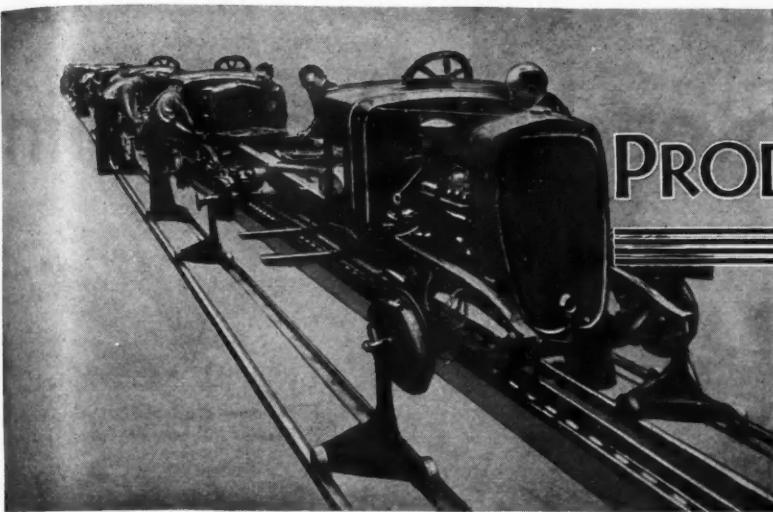
In order to record minute irregularities in the finely ground surfaces of Timken bearings, it was necessary to apply a vertical magnification of 2000 times to the optical system of the profilograph. The trace of the detector point as magnified is photographed as a permanent record.

By comparing Figs. 1 and 2 with Fig. 3, a still more striking example of the improvement in the surface finish is obtained. Fig. 3 shows profilograms of surfaces in their true proportions, magnified 1000 times. The upper trace, *a*, shows a rough hone finish; the middle trace, *b*, a single feed mark of a diamond bore, and the lower trace, *c*, illustrates the finish secured by finish honing.

Alukak Cylinder-Head Gaskets

A new type of cylinder-head gasket is being announced by the Felt-Products Mfg. Co., 1504 Carroll Ave., Chicago. It is made of alternate layers of thin sheets aluminum, asbestos and wire mesh, impregnated with a heat-proof elastic compound. It is said to be ex-

tremely resilient and to flow when heated, which enables it to conform to any irregularities in the machined surfaces due to distortion. This same material has been used for manifold gaskets for some time.



PRODUCTION LINES

"We Discover Pike's Peak"

Pike's Peak has been out there in Colorado for a long time. And we suppose that for about twenty years they have been running Labor Day races up the "highest motor highway in the world." All this left little impression on us—and perhaps others have felt the same way.

* * *

But we are just back from two trips up to the summit—a little matter of 14,109 ft. elevation—and we have acquired not only a healthy respect for old man mountain but a great admiration for the cars that make the grade, as well as the drivers who take them up. From now on anything that goes up that trail against time is all right with us.

* * *

P. P.'s motor highway is a hard dirt road about two lanes wide, sloping from the wheels of your car into canyons down which you can roll 6000 ft. if you care to. At about 12,500 ft. elevation you hit the switchbacks—glorified hairpins. At each of these points you arrive at a sharp turn, requiring the whole corner for one car, and then a steep climb. It's good, clean fun and unexcelled scenery so long as you take it easy and keep the car under control.

* * *

You discover that at 14,000 ft. things are entirely different. The air has less oxygen, less pressure;

the barometer is much lower, and water in the cooling system boils at 187 deg. F. That's why the tourist cars out this way are inclined to have a little carburetor trouble; that's why, too, they have watering stations at regular intervals right up to the summit.

* * *

Back in 1930, stock cars raced to the summit in 24, 25, and 26 minutes respectively for first, second, and third place. In 1934, a Ford V-8 took first place in the breathtaking time of 16 minutes plus. Only now can we appreciate what it took to hang up this new record.

* * *

Now here's something that has been done for the first time in the memory of old man mountain. Last week they took a stock Chevrolet truck up Pike's Peak and set the first truck record. The vehicle was a 1½-ton Chevrolet truck, 131-in. wheelbase, carrying a payload of 1½ tons. Piloted by W. P. Benthrup, long identified with racing in these parts, the Chevvy took old P. P. in 37 minutes and 52 seconds timed by stop watches. Five newspaper editors and your scribe saw it done.

* * *

The figures for the run may not mean very much to the reader. But the next time you are out in Colorado just take a look at Pike's Peak

and picture a loaded truck racing to the summit around the circuit of switchbacks, much of the time in second gear. The fact that the truck made the grade without mechanical difficulty is really a tribute to its lubrication and cooling system because, as we mentioned earlier, water will boil around 187 deg. F. when you get near the top. Incidentally, the rear axle ratio was 6.17 to 1, which means plenty of engine revs in second gear for miles at a time.

* * *

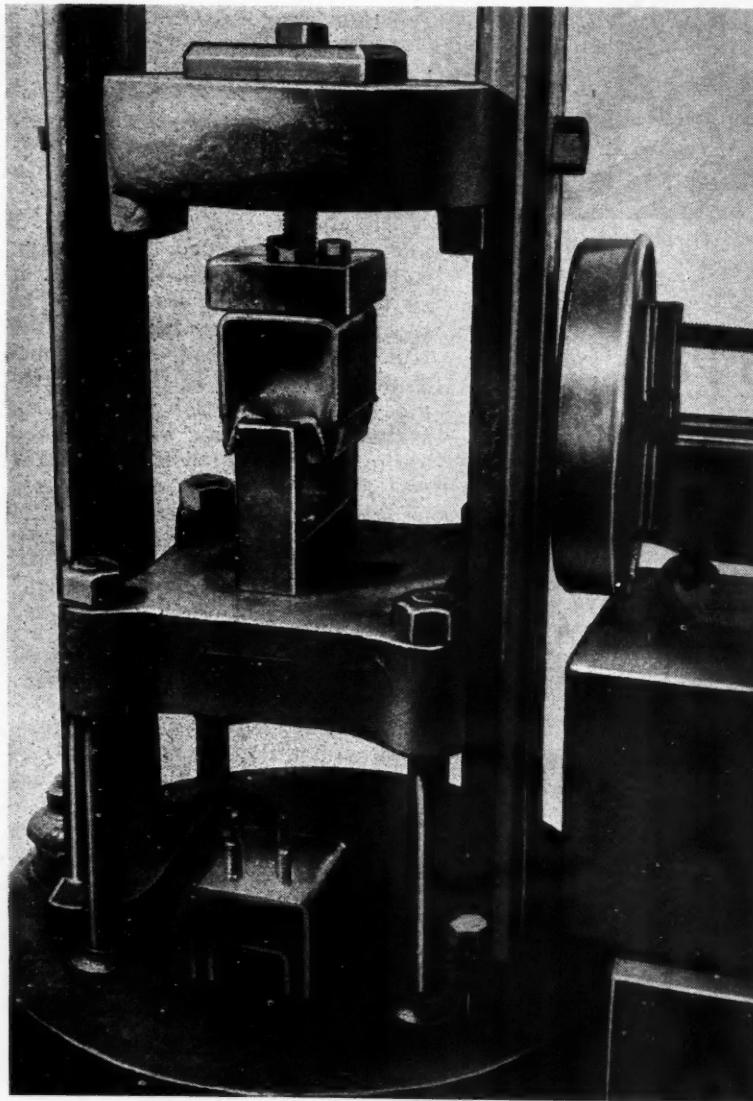
To cap the climax, Harry Hartz made the summit in a ½-ton Chevrolet utility truck (without load) in 25 minutes and 45 seconds, setting still another mark to shoot at.

* * *

Naturally, we are very enthusiastic about all this and are giving you just our own impressions. To appreciate what it means, you must visualize the scene—the long, arduous grade, the switchbacks, and the effects of the altitude on both man and beast. It's safe for us to enthuse because this is the first time that a truck has made the grade against time. What the future holds we don't know; but it wouldn't surprise us to see at least a couple of competitors pitted against each other or against time, individually, before a year is out. —J. G.



Research Steadily Broadening



Testing motor mounting for adhesion of rubber to metal

THE adhesion of rubber to metal has been used for a number of purposes for many years. It had been made possible by means of special hard rubber stocks to attach rubber to rims of truck wheels, but this method of attachment was expensive, complicated, and not suitable for the production of small items such as motor mountings. Some adhesion had also been accomplished by means of brass and similar alloys, but the degree of adhesion re-

quired was never of such an order as to compare with the present requirements.

The car manufacturers very wisely took the stand that mountings, which were to be used on their cars, must have the metal bonded to the rubber so firmly that they would not separate under a pull of 250 pounds per square inch—and that this adhesion must be uniform over the whole surface. The result was, that the rubber manufac-

by J. D. Morron

Manager, Motor Products Development,
United States Rubber Products, Inc.

turers—in order to produce such adhesion at a price commercially possible, were obliged to carry on expensive research, not only on the subject of rubber, but also on plating problems involved in adhesion.

In brief, it has been found that, in order to produce good adhesion, it is necessary to be able to plate metal parts uniformly with a brass of definite composition, and then use a rubber compounded with the proper ingredients to produce adhesion to the brass. While, from the laboratory standpoint, these are the two most important points, in actual production it is necessary to have a careful mold design, an exact preparation of the raw blanks and the carrying out of each operation in proper sequence and time. The production of good adhesion of rubber to metal articles is dependent upon infinite capacity for care and attention to details.

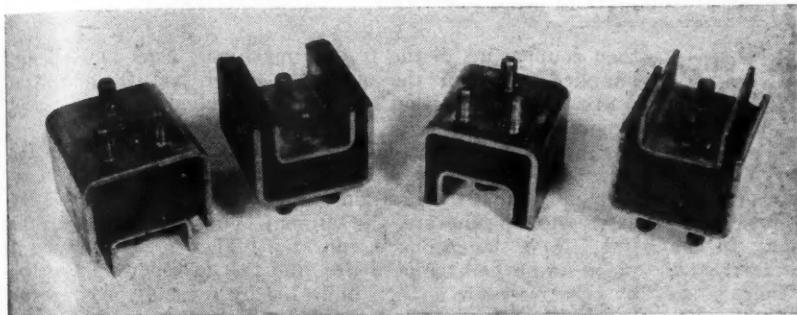
The standard metal used as a base for the plating has been found to be 1010 SAE hot-rolled steel. Realizing that there are many other possible applications of rubber to metal with which it is desirable to use other metals, we have carried out a research program to extend the usefulness of this new art. Due to this research we have been able to accomplish the following new achievements in the adhesion of rubber to metal:

1. Adhesion of rubber to practically any metal except Dow metal and magnesium alloy. This includes various types of steels, cast iron, aluminum, lead, zinc die-castings, and certain types of stainless steels.

2. Adhesion of rubber to metal without the use of copper or copper alloys, such as brass. This is an advantage in certain cases where it is not desirable to have copper or brass present.

3. Adhesion of rubber to metal, us-

Rubber's Automotive Usefulness



Motor mounting before and after curing

ing a metal plate which can be given a bright finish.

4. Adhesion of rubber to metal in any shape which can be molded. This is of considerable importance, due to the fact that certain shapes which may be desirable from the standpoint of construction, are impossible, or at least very difficult to plate in ordinary processing.

5. Adhesion of DuPrene to metal. DuPrene, the new oil-resisting synthetic rubber, can be as firmly adhered to metal, as rubber.

By means of this series of developments it is possible to satisfy most demands of the trade for combinations of rubber and metal.

While the use of rubber, as a lining material for tanks to handle corrosive liquids is not new, much development has been done along these lines recently, and the scope of such lining has been greatly increased—thus permitting the handling of many liquids which ordinarily could not be taken care of. This is of interest to nearly all automotive manufacturers, in view of the fact that all of them employ large plating equipment and such rubber-lined tanks are especially valuable for plating—both because of the corrosion resistance of the rubber, and its insulating properties.

The methods of adhesion which have been developed to unite the rubber lining to the tank have become so perfected that they are available and very satisfactory from the adhesion of rubber to metal standpoint for many other parts which are not suited for molding. By this means it is possible to cover almost any irregularly shaped ar-

ticle of any size with a layer of rubber firmly bonded to the metal—thus widening the field for the application of rubber to metal.

The study of the physical properties of rubber in shear, tension, compression and under constant oscillation, together with the new art of welding rubber to metal, has enabled rubber to be applied very widely in many new fields.

Today, we are making many applications of rubber for springs and insulators in connection with street cars and the high-speed trains which are revolutionizing the railroads. The properties of rubber to dampen out vibration in a much shorter time than coiled steel springs affords a unique material—the value of which we have only begun to appreciate.

A new flexible hard rubber has been made. This rubber is hard, and has the usual properties of hard rubber, but at the same time is flexible, so that it can be bent without cracking. This can be provided not only in black, but also in colors—both plain and mottled. The decorative effects of rubber have never been fully appreciated. A polished piece of hard rubber gives a surface which does not wear out, which is resistant to nearly all corrosive liquids—which has a sheen characteristic to the material, and an elegance which is difficult to duplicate in any other material. Such material can be used by itself or combined with metal for paneling, decorative strips, and for other similar uses.

Hard rubber has largely supplanted all other material for steering wheels. It has the advantages of strength without brittleness, resistance to a wide

range of temperatures, an inherent capacity for acquiring a high polish, and, due to its low heat conductivity and texture, is comfortable to the touch.

The subject of sponge rubber is old, but has recently become of great interest in the automobile business due to the fact that many improvements have been made in sponge rubber. First of all, it is possible to make sponge rubber which has excellent aging qualities, as good as any other rubber. Secondly, improved processes have been developed for making sponge. These developments materially extend the range of rubber as a cushioning and shock-resisting material because of the large deflection of which it is capable.

Each year sees the increase of uses of rubber in the automobile augmented by leaps and bounds. This is due first of all, to the splendid engineering by the automotive companies and their increasing appreciation of this unusual material. Secondly, to the development and research which some rubber companies have carried on in order to perfect their product and widen the scope of its application. One may search through the whole field of industrial materials and none can be found with as wide a range of properties as rubber. No other material can be extended ten times its own length and returned to the original shape. No other material can be produced with the softness of 30 durometer or bone-hard. No other material has such a capacity for dampening vibration within its own structure.

A BRITISH patent (No. 430,663, of June 24, 1935) has been issued to Simms Motor Units, Ltd., and R. L'Orange on Fuel Injection Pumps. The patent covers specifically a method of relieving the pressure in the fuel line between injection periods. A small spring-closed poppet valve is inserted into the regular delivery valve of the pump, this small valve opening in the direction toward the pump barrel, while the delivery valve, of course, opens in the opposite direction.



AUTOMOTIVE ABSTRACTS

England Puts 8 Pence Tax on Diesel Fuel

ON Aug. 8 the new tax on fuel oil for road vehicles, of 8 pence per Imp. gallon, went into effect in Great Britain, superseding the previous tax of 1 penny per gallon. The tax is now the same as that on gasoline. This will greatly increase the revenue from fuel taxes. In the monthly report of the Society of Motor Manufacturers and Traders it was shown that in May of this year there were registered in Great Britain as hackneys (buses) 4320 Diesel-engined vehicles, as compared with 1751 in May, 1934. These figures show how rapidly public-service enterprises in Great Britain are changing over to the Diesel engine.

The new tax on Diesel fuel will add materially to the cost of operation of these vehicles and the hardest hit is the London Passenger Transport Board, which now has in operation 800 Diesel-engined vehicles and is adding to them at the rate of six to eight per week. In spite of the increased cost the Board plans to convert all of its 6000 vehicles. These cover about 50,000 miles per year each on the average. The increase in the fuel tax will cost the Board approximately \$275,000 a year. Under the new tax, a 5-ton vehicle, to make conversion economically justified, must cover at least 22,000 miles per year, as compared with 17,000 miles formerly, but these mileages are small compared with those actually accomplished.—*The Engineer*, August 19.

Routine Engine-Testing Practice in England

A NEW engine testing plant has been installed in its Longridge works by the Austin Motor Car Co., Ltd. It comprises 26 electric-testing sets, 24 of them being arranged in two lines, for testing 10-hp. and 12-hp. engines respectively. The two extra sets are used for testing sports-car engines, which are run up to 4500 r.p.m.

Each testing set consists of a d.c. machine that can be used either as a generator or a motor; together with a direct-connected tachometer and a control pillar. As the engines leave the assembly line they are brought directly to the test stand by means of an overhead conveyor. Water, oil and fuel connections are made to the engine, which is

then coupled up to the testing machine. Fuel and oil are supplied to all of the machines under test from central sources, while ignition current is supplied by five special generators.

Previous to the actual test the engine is run in by the electrical machine at a low speed. After a suitable "running-in" period the ignition current is switched on and the set starts to generate, the current being fed back into the line. Next the engine is run at a higher speed to bring it up to its normal temperature, and the horsepower absorbed by the generator is then indicated by a meter. After two hours of such operation the speed is reduced for the purpose of making adjustments on the engine.

The engine is then tested over its whole speed range at full throttle, the output being shown by an ammeter calibrated in horsepower and the speed by an electric tachometer. A 10-hp. engine must develop 20 brake horsepower and before being passed on is rigidly inspected.—*The Engineer* of August 2.

Advantages of "Waisted" Screws

A "WAISTED" cap screw, that is, a screw in which the greater part of the shank or unthreaded portion is turned down to the bottom diameter of the thread, has several advantages over conventional screws. Owing to the greater elasticity of the "waisted" screw, the alternating stress due to normal load is reduced. In case of shock load the value of the normal load itself is reduced. Because of the elastic yield of the waisted screw, the factor of safety against loss of initial tension is increased, which loss results from small plastic deformation of the thread faces under load. The reduced factor of safety against permanent deformation can be compensated for by a suitable method of production. This was found to be still possible when the cross-section of the shank was reduced to 80 per cent of the cross-section at the bottom of the thread.

Reduction of resistance to bending, which accompanies a reduction in the shank diameter, is beneficial from one point of view at least, for the stresses imposed by given permanent bending deformations are smaller in the case of the "waisted" screw.

Waisted screws are used in connecting-rod heads, housings of steam turbines, high-pressure flanged joints, etc. It is predicted that such screws will take the place of the conventional type wherever parts are subjected to high alternating loads.—*V. D. I.*, July 27.

A New Method of Case-Hardening and Heat Treating

A NEW method of case-hardening and heat treating steel in a liquid bath has been developed by the American Cyanamid and Chemical Corporation, 30 Rockefeller Plaza, New York. The medium used for the bath is known as Aerocase. It is claimed for the process that the case produced is of uniform depth and hardness and is not brittle; that it takes only three hours at 1600 deg. Fahr. to produce a depth

of case of 0.030 in.; that the bath fumes only slightly at 1600 deg. and that the fumes are not irritating; that the molten bath has no corrosive action on the pot; it is very fluid and the mechanical loss or "drag-out" therefore is small; the salts can be readily removed from the steel; the bath can be used as a neutral heat-treating medium for light cases or for cases up to 0.032 in., by varying the quantity

of activating material added.

The manufacturer of Aerocase, in cooperation with a large manufacturer of automotive transmissions, recently completed experiments in treating medium-carbon alloy steels in the Aerocase bath. According to the transmission manufacturer, the results of these tests were so satisfactory that it was decided to treat next year's production in Aerocase.

Series AP Wico Magneto

A new ignition magneto of the inductor type has been announced by the Wico Electric Co., Springfield, Mass. It is made for engines with from one to six cylinders of both the four-cycle and the two-cycle type, and is adapted for both flange mounting and standard high- or low-base mounting. The magneto, complete with impulse coupling, dust cover and adapter plate, weighs only $7\frac{3}{4}$ lb.

The new Series AP magnetos embody the features of rotating magnets, stationary coil, fixed interrupter, and rotating cam that have been characteristic of Wico magnetos for a long time. The magneto housing consists of an aluminum die casting cast around the laminated pole shoes of silicon steel. The rotor also is an aluminum die casting, holding the magnets of high-cobalt steel and silicon-steel laminations. The end opposite the drive end is flared to provide for the return of the lubricant to the reservoir.

A hardened, drop-forged steel shaft with integral drive end plate is secured to the rotor with two dowel pins and four screws. The rotor telescopes a hollow stud which is knurled and die-cast into the main housing. Its shaft is supported in the hollow stud on two needle bearings. Oil is constantly being circulated through these bearings by the elevator effect of the oiling disk and the centrifugal action of the oil slinger.

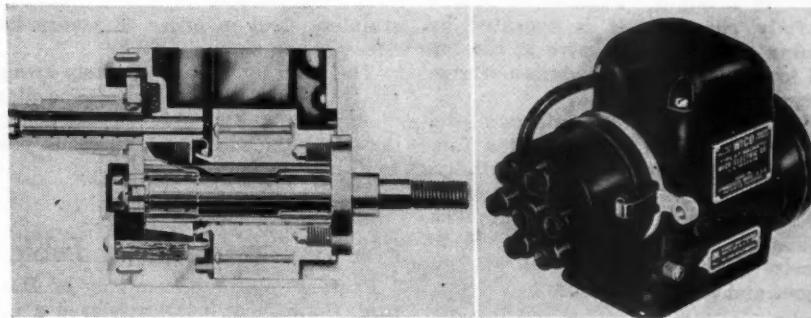
The oiling disk, keyed to the rotor shaft, rubs against the oil pad at the bottom of the housing, picks up the oil, and elevates it to the scraper, which presses against it by spring action. The lubricant is scraped off the oiling disk and flows down a channel into the oil reservoir of the needle bearings. Oil is also fed by the oiling disk to the cam gear and to the felt pad which provides oil to the cam stud through a wick recessed in the journal of the breaker cam.

From the reservoir, oil passes through the needle bearings, over the end of the hollow stud and along the inside surface of the magnet rotor. At the end of its path through the rotor is the oil slinger, a flared projection of the die-cast rotor. The centrifugal action of this oil slinger pulls the oil through the rotor out into the ring-shaped oil catcher, from which it flows back to be filtered and the cycle repeated.

In the two-, four-, and six-cylinder models, the cam rotates at one-half engine speed. The breaker-box assembly is mounted in a die-cast aluminum housing and is piloted to the gearcase cover over a brass bushing tightly pressed into the cover. The breaker arm is of molded Bakelite with a linen base. A self-lubricating bushing is pressed into the arms and bears on a hardened steel bushing over a pivot integral with the breaker-box assembly. A rivet through the breaker-arm clamps the interrupter spring and the moving-contact plate, to which latter

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the forged tungsten contact point is welded. The fixed contact also is of tungsten and is welded to a heavy steel plate pivoted to the axis of the breaker-arm. It is provided with an eccentric pivot for adjustment, and with a locking screw for fixing it in position. This construction is said to assure that the contact surfaces always remain in a plane with the axis of the breaker-arm pivot. An aluminum cast split ring serves as timing lever and is clamped to the breaker-box assembly.

The distributor rotor is of Bakelite and has a Monel-metal segment imbedded in it. On the outer edge of the rotor are the markings which indicate the timing position of the cam. Monel-metal segments are molded into the distributor cap of black Bakelite. Terminals for the spark-plug leads are of the screw-and-insulated-nut type, and are recessed to prevent leakage. A terminal is provided on each side of the main housing of the magneto for the installation of a stop button or "shorting switch."

Access to the coil assembly may be obtained by removing four screws in the Bakelite cover of the main housing. The coil has a laminated core and its windings are vacuum-heated and impregnated under pressure. It is mounted on top of the cast-in laminated cores of the main housing.

The impulse coupling is of the clock-spring type and the driving and driven members are steel forgings. On standard models of the Series AP, the impulse coupling is provided with an aluminum die-cast cover, which is secured to the main housing of the magneto with four screws. A dust shield consisting of a heavy felt ring, is supported by a steel disk. The aluminum impulse cover is eliminated when the magneto is flange-mounted.

New Pyrene Pressure Extinguisher

A new 2-quart vaporizing-liquid fire extinguisher that is discharged by air pressure and delivers a fan-shaped spray as well as a solid stream has just been announced by the Pyrene Manufacturing Company, Newark, N. J.

This extinguisher is recommended by the manufacturers for incipient fires in all classes of material, and especially for flammable liquids and electrical fires. It is anticipated that it will be



used in garages, filling stations, buses, trucks, factories and around electrical equipment and flammable liquids.

The top and bottom castings are fastened to inner and outer seamless shells forming two chambers. The inner chamber holds air under pressure, and the outer contains fire-extinguishing liquid. To keep down the cost and weight, no built-in pump is used, but the air pressure is renewable at any air line having a pressure of 100 lb. or more. The extinguisher weighs $16\frac{1}{2}$

NEW DEVELOPMENTS

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New Safety Device for Punch Presses

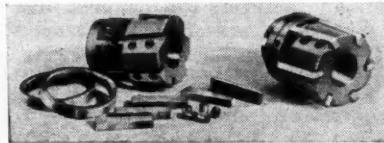
A new safety device for practically all sizes and makes of hand-operated punch presses is being introduced by David J. Ross Company, Benton Harbor, Mich. This device, known as the "Rousselle," consists of a bar, a one-piece housing, operating lever and spring, so arranged that a touch on the

lb. fully charged. It is operated by opening the operating valve at the top and controlling the combination discharge nozzle.

This discharge nozzle produces a solid stream when opened wide, and a fan-shaped spray when opened partially. When the nozzle lever is released, it serves as a temporary shut-off. The fan-shaped spray causes the liquid to vaporize quickly, the vapor displacing oxygen and smothering the fire.

New Reamer with Serrated Blades

The illustration shows clearly the construction of the new Pratt & Whitney adjustable serrated blade reamer. The serrations on one side of each blade fit into corresponding serrations in the reamer body and two cams lock each blade in place. Adjustment for size is made with the two nuts at the



rear of the blades, a quarter turn forward increasing the reamer diameter 0.0003 in. The serrations also play an important part in size adjustment, as it is only necessary to slip each blade into the next serrated stop when a considerable size increase is required, each stop increasing the diameter 1/16 in.

Due to the large area of contact provided by the number of parallel bearing surfaces of the serrations, the alignment and positioning of the blades in the reamer body is said to be accurately maintained under all operating conditions. Seven sizes of blades cover the entire range from 1 1/4 to 6 in. inclusive.

This reamer is a product of the Pratt and Whitney Co., Hartford, Conn.

Stelco Welding Tips

The new Stelco welding tips, recently introduced by the C. H. Dockson Company of Detroit, Mich., are made of pure, hard drawn, electrolytic copper which is said to be highly resistant to heat, wear and abuse. The hexagon base, including the threads for screwing the tip into the torch, is made of

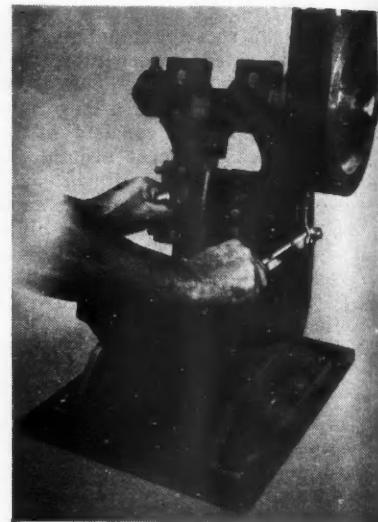
stainless steel in order to secure long life.

The interior bore, accurately swaged and tapered gradually to a cone diameter, is claimed to give a flame concentrated at the most advantageous point for high speed welding.

P & W Tilting Rotary Table

Pratt & Whitney Company of Hartford, Conn., has just introduced a new 10 in. Tilting Rotary Table, designed for use with the Pratt & Whitney No. 1A Jig Borer. This table is for precision boring holes at exact angles as well as for boring work of a circular nature which is most easily laid out, using polar coordinance. The scraped surface is 10 in. in diameter, and contains standard work holding T-slots and an accurate hole in the center for locating work. The outer edge of the table is graduated in degrees for approximate indexing using a large rapid traverse handwheel. For exact setting a slow motion handwheel is engaged by a clutch knob. The large graduated dial and its vernier make possible accurate indexing to two seconds. A non-influencing binder keeps the rotary movement locked solidly during boring.

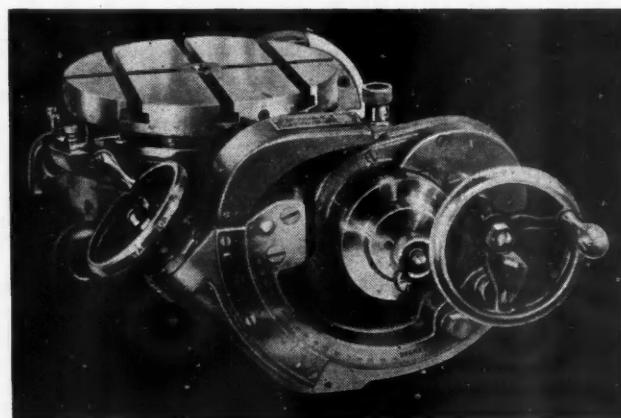
The entire table is hinged at one side and can be tilted to any angle from zero to 90 deg. Graduations and a vernier provide for accurate setting to one minute. The tilting movement locks solidly during boring. The table height in a horizontal position is 6 1/8 in. Net weight is approximately two hundred pounds.



safety lever with the left hand, when the press is tripped by the right, releases the punch press lever. In this way, both hands are in use and out of the way of danger every time the press is tripped, and the safety device springs back into place instantly when released, locking the punch lever securely.

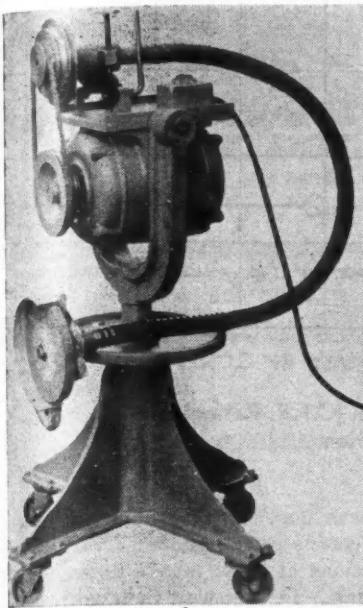
New Stow Power Unit

Designed for grinding, polishing, sanding, buffing, etc., the model D-238 portable power unit is the latest product of the Stow Manufacturing Co., Inc., of Binghamton, N. Y. Built in sizes from $\frac{1}{4}$ to 2 hp., the motor and pulley head are mounted in such a way that they can swivel in both the horizontal and vertical plane to take care of any position of the flexible shaft. The pivots are



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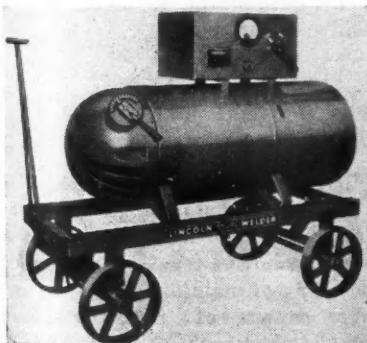


all ball bearing in order to secure easy movement.

The pulley head is provided with a cam arrangement so that the center distance can be changed quickly in order to change the belt position on the cone. A screw adjustment is also provided to take care of the stretch in the belt.

New AC Welder Announced by Lincoln

The Lincoln Electric Company, Cleveland, Ohio, announces a new alternating current welder known as the "Shield Arc AC." This new welder is of the motor generator type which takes 2-phase or 3-phase alternating current of standard voltages and frequencies and



converts it into alternating current of lower voltage and at a higher frequency most suitable for welding with either heavily coated or washed electrodes.

For this equipment the manufacturer claims improved arc characteristics, due to the higher frequency, such as more stable arc, less magnetic blow and easier starting of arc; as well as better power characteristics from the line. Since the machine takes power from all phases instead of from one phase, unbalance of phases is eliminated and the power factor is said to be approxi-

mately double as compared with the transformer type.

The new "Shield Arc AC" welder is built in portable and stationary models in two sizes, the smaller having electrodes of 3/32 to 5/16 in. in size, and the larger electrodes from 1/8 to 3/8 in. diameter.

Production Milling Machine For Small Parts

To meet the requirements of light milling operations for general manufacture and toolroom service, Kearney & Trecker Corp., Milwaukee, Wis., has introduced the model H milling machine in plain, universal and vertical types. They are provided with 16 quick change speeds, with optional ranges of either 20 to 800 or 50 to 2000 r.p.m. These millers feature the double overarm support to the arbor on the horizontal model, while the vertical type has a sliding head with 4 in. travel.

The model K high speed, wide range, knee type machine illustrated has been entirely redesigned, one of the new features being duplicate front and rear control for both hand adjustment and power feed operation. This machine has

24 spindle speeds in one continuous series in approximate geometric progression without any one speed overlapping another. Speed selection is made with a single lever and large direct reading dial.

An interesting improvement is the casting of an integral trough in the rear of the knee to carry off chips and prevent them from piling up between the saddle and the column face causing possible damage to the bearing surfaces.

A brand new addition to the line is the No. 1218 Simplex Milwaukee bed type miller equipped with hydraulic feed and automatic spindle stop. The feed can be provided with a delayed reverse, if desired, for milling to a shoulder. Table feeds range from 0 to 100 in. per minute.

Correction

On page 314 of the Sept. 7 issue of *Automotive Industries* the title of the illustration of the Rivett lathe should have read: "Rivett Lathe & Grinder Corp. is showing an open head lathe."

Oil Consumption Found to Increase with Detonation

(Continued from page 364)

nate against time as abscissa. In addition to these charts covering one run each, two summary charts are included of which one gives a general survey of all the oil-consumption data and the other of the engine-wear data.

It is realized by the authors that the premise that the owner is interested primarily in the effects of the oil on consumption and cylinder wear does not cover the subject completely. He is interested also in cold-weather starting, high-temperature operation, friction loss in the engine, carbon formation, pitting or corrosion, and sludge formation. However, the cost of direct determination of factors other than oil consumption and cylinder wear would have been prohibitive, and data of certain physical properties were considered as reasonable indices of merit. Thus the pourpoint and the zero viscosity factor of the oil are useful indices of cold-starting ability, while the oiliness number, determined as described in the foregoing, is considered a satisfactory index of the friction loss at points where the load is high and the rubbing speed relatively low.

After each run the carbon formed on the cylinder heads was carefully removed and weighed, and a comparison of the results obtained (in grams of carbon per 1000 grams of oil consumed) was made with the Conradson carbon determination on the oil after 8 hr. of use. At first sight it appeared that the correlation between Conradson carbon number and actual carbon formation was poor, but when the results of certain runs were eliminated, in which extracted oils were used, the correlation was found to be good. The conclusion drawn is that for an extracted oil the Conradson carbon determination gives a better picture of the carbonization characteristics of the oil than is warranted by results of engine tests.

Reverting to the basic object of the investigation, the authors say most people probably would agree as to the desirability of some sort of merit number for an oil, but it is equally probable that they would disagree radically on the weights which should be given the component factors. They give a list of factors important to the consumer (stability, low-temperature performance, cleanliness, friction, wear and consumption) for each of which they give a method of expression in numerical terms, and they present this "as a plastic nucleus to be molded, added to, or taken from, as experience and more complete knowledge may dictate."

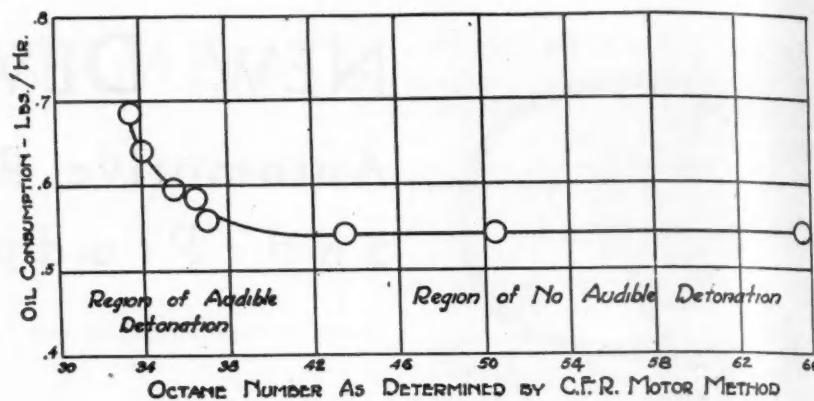


Fig. 2—Effect of detonation (C.F.R. Rating) on oil consumption

Great difficulty was experienced in getting consistent oil-consumption figures. Erratic fluctuations of the oil level in the detached sump were found to be due to the bubble effect of the air current (simulating the road breeze) over the top of the sump. A loose canvas bag or hood tied over the sump broke up the eddies effectively. It was also found necessary to vent the drain pipe from the crankcase to the sump, for sometimes there were variations of air pressure in the crankcase, and these were transmitted to the sump. Consistent consumption figures could be expected only after the engines had reached a thermal equilibrium in each run; for this reason oil consumption was determined at first only after the first one hour and a half, and later only after the first three hours of each eight-hour run.

After completion of the main series of tests, a separate series was run to determine the effects on oil consumption of the cooling-water temperature, the rate of oil circulation, the oil temperature, the air/fuel ratio, the load at a given speed and the speed at a given load. These tests were made under arbitrarily set engine operating conditions as a reference condition, including 3250 r.p.m., 48 b.h.p., 230 deg. F. oil-inlet temperature, 14:1 air/fuel ratio, 160 deg. F. water-outlet temperature and 16 cu. ft. of oil circulated per hour.

One factor was varied at a time, all others being kept constant, and the effect on consumption was observed. The results are given in Fig. 1. In the course of this investigation it was discovered that runs for which there was an annotation of "Detonation" in the logbook consistently showed a high rate of oil consumption. To further investigate this apparent relationship, a special series of tests was arranged, in which only one factor, the fuel, was changed, all others, such as speed, load, spark setting, etc., being kept the same. A single base fuel was used, but

it was doped with aniline to increase its octane rating and with various proportions of amyl nitrite to reduce this rating. In this way fuels with octane ratings ranging from 32 to 67 were obtained. Octane numbers were determined by two different methods. In Fig. 2 consumption figures are plotted against octane numbers as obtained by the C.F.R. motor method. It will be seen that the oil consumption increased progressively with reduction of the octane number (and consequently with increase in the severity of the detonation). The run on each fuel continued for three hours and the authors observe that these tests punished the engines very severely, one engine burning out a connecting-rod bearing, another loosening a valve-seat insert, a third repeatedly blowing a gasket over No. 6 cylinder, and only one coming through the ordeal unscathed. That three hours under approximately two-thirds load on a fuel with 32 octane rating is severe punishment to an engine will readily be granted.

Renew Brake Drums by Welding With Bronze

ACCORDING to *Oxy-Acetylene Tips*, an eastern state highway department operating some two hundred front-wheel-drive trucks has discovered a new way of maintaining the cast-iron brake drums of the transmission brakes (which evidently are used for purposes other than those of a parking brake). This drum, which is 11 in. in diameter and has a face width of 7½ in., was found to wear rather rapidly. The braking surface, when worn, is built up with bronze welding, 11 lb. of the metal being applied uniformly over the whole surface, and the drum is then turned down smooth. It is claimed that when thus "bronze-surfaced" the brake drum does not chatter and that the rate of wear is less than with the original cast iron surface.